



USAID
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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

FOR USAID SUPPORT TO SMALL-SCALE ARTISANAL MINING
ACTIVITIES IN SIERRA LEONE



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February 2005



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DISCLAIMER

This publication was produced for review by the United States Agency for International Development Mission to Sierra Leone. It was prepared by Marshall Fischer of International Resources Group in collaboration with Andrew Keili of Cemmats Group Ltd.

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ACRONYMS

ADB	African Development Bank
APC	All Peoples' Congress
BEO	Bureau Environmental Officer
CARE	Cooperative for American Relief to Everywhere
CESP	Country Environmental Strategy Paper
CFR	U.S. Code of Federal Regulations
CHECSIL	Commonwealth Human Ecology Council of Sierra Leone
CMP	Core Mineral Policy
CSSL	Conservation Society of Sierra Leone
DACDF	Diamond Area Community Development Fund
DFID	Department for International Development
EA	Environmental Assessment
FADE	Focus, Analyze, Develop, Execute
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GGDO	Government Gold and Diamond Office
GEF	Global Environmental Facility
GOSL	Government of Sierra Leone
GTZ	German Technical Cooperation Agency
IUCN	International Union for the Conservation of Nature
IEC	Information, education and communication
IEE	Initial Environmental Examination
IVC	Integrated vector control
IVM	Integrated vector management
KP	Kimberley Process
MEO	Mission Environmental Officer
MAFFS	Ministry of Agriculture, Forestry and Food Security
MMR	Ministry of Mineral Resources
MMO	Mines Monitoring Officer

MSI	Management Systems International
MANRF	Ministry of Agriculture, Natural Resources and Fisheries
MLHE	Ministry of Lands, Housing and the Environment
MOCKY	Movement of Concern of Kono Youth
MW	Mines Warden – Ministry of Mineral Resources
NDMC	National Diamond Mining Company
PDA	Peace Diamond Alliance
PEA	Programmatic Environmental Assessment
PRSP	Poverty Reduction Strategy Paper
RUF	Revolutionary United Front
SLP	Sierra Leone Police
UMU	United Mineworkers Union
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
UNAMSIL	United Nations Mission in Sierra Leone
USEPA	U.S. Environmental Protection Agency
WB	World Bank
WHO	World Health Organization

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The team would like to express its gratitude to Paul Temple and the MSI Peace Diamond Alliance team in Freetown, Kono, and Tongo for the substantial assistance provided us, both with regard to information that was shared as well as logistical support in the field.

We would also like to thank the many people with whom we visited that shared openly and candidly their thoughts about the direction and future of the artisanal diamond-mining sector. We believe that the process of conducting interviews provided many of them with their first real thoughts about how the problem might be managed and why it may be beyond just the responsibility of the government to deal with. Hopefully, this review will provide a firmer foundation for this thinking to grow and for more responsible environmental management notwithstanding donor programs requiring such.

This report was prepared as a task under USAID contract EPP-I-00-03-000 13-00 that included specific terms of reference regarding areas to be included in the assessment. The assessment team consisted of Marshall Fischer, Team Leader, Dr. Bernadette Lahai, Social Scientist, and Henry Kangbai, Mining Engineer. Tamba Kpakama and Andrew Keili provided additional support. Mr. Keili, Executive Director of CEMMATS, supervised the local consultant team members. Work was conducted between December 2004 and February 2005, including in-country activities over the period January 3 – February 7, 2005.

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SUMMARY OF FINDINGS

The artisanal mining sector of Sierra Leone became highly visible as a result of the civil war that plagued the country for the entire decade of the 1990's. Soon after the war began, rebels seized much of the diamond areas and used proceeds from smuggling diamonds out of their occupied area to continue to prosecute the war in Sierra Leone as well as other locations. Although much of the information regarding the smuggling of Sierra Leonean diamonds to further sponsor terrorist groups operating in the west is speculative, illicit mining and illegal transboundary shipments of stones has been well documented and represents a general threat to the security of both West Africa as well as other parts of the world.

After the rebels and the government negotiated a state of peace, it was recognized that the artisanal diamond sector remained a key area of concern for stability. Artisanal generally refers to very small-scale activities of an individual or family nature. Tens of thousands of ex-combatants from the war came to view artisanal mining as their opportunity to regain a bit of financial security. The government seemed to accept that this kind of mining activity was within the general rights of the people and the international community hoped that it was a sector that could effectively absorb large numbers of people that had few other possibilities in the Sierra Leonean labor force.

The Peace Diamond Alliance (PDA) originated as a directive of the President of Sierra Leone that was issued in the summer of 2003. USAID has provided resources to the Alliance to assist in the implementation of its broad objectives of:

- Promoting transparent, fair, and safe local markets in the diamond sector,
- Maximizing benefits to local miners, diggers, and their communities,
- Tracking diamonds from earth to export to facilitate compliance with the Kimberly process,
- Combat corruption by normalizing and rationalizing the market and associated mineral policy, and
- Facilitation and improved effectiveness of local surveillance and mines monitoring.

The USAID support activities are being implemented by MSI. Additional support to PDA is being provided through the United Kingdom's Department for International Development (DfID).

Ranked high amongst the constraints the PDA identified impeding its ability to reach the objectives was the lack of credit options for the miners and workers who actually excavate the stones from the alluvial materials in areas downstream of diamondiferous formations. USAID has done limited analysis of this activity and has yet to undertake any specific design for such a credit program. Among the concerns of the Agency is that increased support to the sector would likely have environmental consequences.

In accordance with the applicable environmental regulations governing project development by USAID, the agency commissioned the preparation of this report to assess the level of environmental concerns and related management systems of the artisanal diamond-mining sector. The study is a Programmatic Environmental Evaluation because it looks broadly at the sector as a whole, providing a framework for the application of site-specific environmental appraisal that might be required in the future.

The authors of the study collected significant information prior to beginning actual field activities from January 3-February 7, 2005. Two trips were taken up-country into the diamond production areas of Kono and one trip was taken to the Tongo Field area where Peace Diamond Alliance Activities are, for the most part, centered. Numerous consultation meetings were held during the analysis and option development period

including three workshops to stimulate group discussions about the issues. A final workshop to present the preliminary findings was held just prior to completing the draft report for comments by USAID.

Mining severely disrupts the landscape and the current practices in Sierra Leone do not adequately address reclaiming lands after mining is completed. Among the biggest problems is the government's lack of attention to the suitability of lands for continued mining and the belief that the areas may be re-mined in the future. Other than the land disruption, the team found that the kinds of environmental concerns from artisanal diamond mining do not present substantial risks to human health or the ecosystems beyond that which occurs from the impoverished condition of the country and the poor sanitation and agricultural practices that are evident even within the mining district. Current mining practices are not environmentally appropriate, but proportionally, the overall disregard for the protection of the ecosystem, health, and the community constitute a much larger problem.

For the past 60 years, Sierra Leoneans have been looking for diamonds using artisanal methods and have already done substantial damage to their landscape and altered drainage patterns. Institutions that are either in place to prevent the uncontrolled exploitation of minerals are at best weak, but more likely contributing to the chaos, appearing to be more motivated by the payment of fees than responsible resource management and the longer-term benefits that mineral resources could have provided to the country. Alternatively stated, despite current systems capable of asserting better controls, the authorities have imposed additional burden on the future of the country, deferring the costs of reclamation of land that at some future time will be subsidized by all the citizens of the country.

Local authorities and communities also need to take greater responsibility for the current situation and reverse their complicity in continued environmental destruction. The political landscape of Sierra Leone is somewhat encumbered by what now seems to be a dual system of contemporary local governance and traditional Chiefdom authorities competing for revenues. Both seem to lack purpose regarding their important role of serving the community by ensuring responsible resource management. Traditionally, the role of the Chiefdom was to protect the interests and assets of the community. The Chiefs are stewards of the lands and their approval is necessary for any activity to take place on such lands. During the study period, there was no evidence that the Chiefs ever gave consideration to the environmental impacts from mining activities or the future of the lands when granting license applicants access to do mining. The only factor that seemed to dominate the decision process was the payment of surface rents and the prospect of getting additional grant moneys from the Diamond Area Communities Development Fund.

Within this setting, licenses for artisanal mining continue to be issued despite routine omission of financial accountability and remediation plans required by the application process. Presumably any credit program supported by USAID must ensure full compliance with these provisions even if they have been avoided through past practice. This is particularly true since the Programmatic Environmental Assessment finds the non-enforcement of the specific requirements by the MMR has significantly contributed to impairment of the environment in the past. Therefore, the team recommends that any artisanal mine operation supported by USAID programming provide full disclosure of the financing of their operations by submitting a complete business plan that specifically includes remediation and environmentally safe practices that will be employed. Such practices should provide for the continuous backfilling of washed gravels as soon as possible after extraction of any minerals has been completed.

The assessment also examines alternatives to the credit program to meet the general objectives of the PDA. The alternatives considered during this assessment include:

- The Proposed Credit Alternative
- The No Action Alternative
- Support to Reverse Mining Operations
- Agricultural Credit Program for Diggers

- Institutional Strengthening for MMR, Local Governments and Chiefdoms. What we mean by ‘reverse-mining’ is a process of operation very similar to the recommended continuous backfill method but with the primary objective of putting the gravels back in order to reclaim the lands. Recovery of precious minerals would be considered bi-product of that objective. All gravels would be thoroughly washed to fully extract stones before replacing the gravels back into the formation. With all stones removed, the land would be permanently removed from consideration for any future mining activity. From a mineral production viewpoint, there is substantially no difference in the efficiency of the amount of minerals produced. Proceeds from the recovered stones would be used to offset the costs of reclamation that had initially been covered by some sort of grant mechanism or reclamation at additional sites. Depending on the design of the program, a portion of the proceeds could also be directed to the community for other beneficial programming. A more complete explanation of the management benefits and issues of such an approach are contained in the full report.

The artisanal mining currently receives substantial subsidies from the GOSL weak regulatory approach to the sector. Avoided costs and inadequate labor compensation are likely the main reasons that many operations within this sector might be cost-effective. Structural changes in the way the GOSL manages its resources is urgently needed to gain appropriate control of the industry and to develop strategies to rationalize the artisanal mining sector. Among the important considerations is providing a viable exit strategy for the majority of those persons now involved in the sector who find this their only alternative for subsistence. Among the areas for structural reform are the following:

- Roles and Responsibilities of Authorities are perverted – conflict of interests and the opportunities for corruption within these authorities is rampant.
- Incentives within the sector are not balanced and decisions seem to be more motivated by trying to increase fee revenues than manage the lands and mineral exploitation. This includes Chiefdom authorities that appear to overlook their land stewardship obligations in order to increase surface rent receipts.
- The lack of understanding or current characterization of the mineral resources exacerbates the issues – the current system allows the country to be torn up, even in areas where mineral extraction appears to be unviable.
- The entire industry is cloaked in secrecy – operating agreements are often informal and do not capture all responsible parties and their duties, the disclosure requirements that are contained in the law are routinely disregarded.
- Local governments, Chiefdoms, and the people of Sierra Leone seem naive as to the cost being born by the Country for inadequate management of its mineral resources.

The team does not believe that the proposed credit program provides a workable tool to help overcome the current problems of the artisanal mining sector in Sierra Leone because it is unlikely that it can be effectively utilized. Our view is that the condition for the credit model proposed by PDA is not ripe and, although mitigations to minimize any environmental consequences of mining activities can be established, the overall impact of the program will be negligible. Unless the government simultaneously takes steps to ensure that all mining operators conform to these environmental responsibilities, the avoided costs result in a distortion that makes the current financing system more attractive and the environment would continue to be torn up, as is currently the case.

The team recommends that the Agency consider the merits of the ‘reverse mining’ concept that involves the clean-closure of mining plots and the recovery of the diamonds as a secondary bi-product. This option provides the opportunity for PDA to demonstrate many elements of its ‘code of conduct’ as well as

alternative financing for mining activities that could continue to provide short-term livelihood support for many of the diggers currently working in the sector.

For the long-term, it is essential that the GOSL revisit its entire approach to artisanal diamond mining and look for an exit strategy for the tens of thousands of people trapped in the cycle of poverty it currently represents for them. USAID support to this restructuring of the GOSL approach would be consistent with the Agency's objective of improved governance—the artisanal diamond sector represents a microcosm of the entire governance problems currently faced by Sierra Leone. The sector must become much more transparent, policies must reflect a wider set of values than simply focusing on revenues, and checks and balances must be put in place to stop the abuses of authority by officials who appear to act only on their personal behalf.

USAID ENVIRONMENTAL REVIEW PROCEDURES

OVERVIEW

USAID's environmental requirements at 22 CFR Part 216 direct the Agency to assess the potential environmental consequences of any proposed program prior to committing funds for program implementation. As part of this environmental assessment, the Agency must consider alternative approaches to the program and practical mitigation measures that could reduce the concern for possible negative environmental consequences.

To help focus and manage the environmental assessment process, the Part 216 regulations contain a provision to screen the program for possible environmental concerns using an approach referred to as an Initial Environmental Examination (IEE). The IEE is a decision document used to support a determination as to what extent environmental concerns are significant, specify limitations to the proposed USAID program to minimize the concern for more comprehensive environmental controls, or require extended study to more fully establish the degree of possible environmental impacts, alternatives, and necessary management controls to prevent significant environmental consequences.

Under certain emergency provisions of the environmental regulations, the environmental review process can be waived. However, this is an exceptional circumstance and normally requires formal consultation with the Council of Environmental Quality before it is undertaken. Another provision of USAID environmental regulations which often seems to dominate the IEE dialogue is the concept of 'categorical exclusions.' A 'categorical exclusion' is a presumptive term that suggests that if an activity falls within a certain category of program intervention, the environmental consequences of such action are likely to be de minimus in nature and therefore the activity may be excluded from further environmental review. Prudent application of a categorical exclusion necessitates confirmation that the activity fully fits the exclusion criteria and does not itself directly enable other activities with environmental consequences.

If an IEE recommends additional environmental study (or in some cases if it can be presumed from the outset that additional study will be needed), the Agency is responsible for preparing a full Environmental Assessment (EA). In some instances, even more review is needed in the context of an Environmental Impact Assessment or EIA. The regulations also provide for a particular type of environmental assessment called a "Program Assessment," also known as a Programmatic Environmental Assessment (PEA), which is used "to assess the environmental effects of a number of individual actions and their cumulative environmental impact in a given country or geographic area, or the environmental impacts that are generic or common to a class of agency actions, or other activities which are not country-specific." It is under this PEA provision that this assessment was undertaken.

A PEA is not necessarily the last word on the category of action in question, but often must be complemented by a country-specific assessment that addresses implementation details that could not be adequately addressed in the PEA.

PURPOSE AND APPROACH OF THE PEA

The purpose of this PEA is to assess environmental impacts that may result from USAID support to the small-scale artisanal mining sector in Sierra Leone. More specifically, the Agency is contemplating the establishment of a finance facility or mechanism to provide credit to artisanal miners. The principal purpose

of such a credit program would be to obtain commitment from these miners that they would adhere to a 'code of conduct' which would generally lead these miners away from illegal and environmentally insensitive practices toward more manageable and regulatable operations.

There are several guiding principles that USAID follows in undertaking the PEA. The PEA must:

- Consider real alternatives,
- Identify and concentrate on the key issues,
- Predict key impacts and judge their significance,
- Identify ways to reduce these impacts,
- Communicate with clarity,
- Be systematic with reproducible logic, and
- Provide for appropriate stakeholder input.

For many PEAs, the evaluation is based on a fairly well-designed project description that helps to define the issues. At the point of this PEA, only very limited design work had been undertaken and much of the detail about the sector, not limited to just the environmental concerns, still needed to be better vetted. Consequently, this report attempts to provide a more thorough overview of the sector to provide sufficient background to understand the potential environmental consequences, as well as alternative approaches.

USAID makes reference to the need for an Environmental Assessment in a June 2004 IEE prepared for its Special Strategic Objective 2, Democratic Governance Strengthened. The objective includes three intermediate results as follows:

- IR1: Broadened community-based political participation,
- IR2: Promoting civic dialog and informed participation in public affairs, and
- IR3: Strengthened efficiency of Government and local communities to manage the diamond sector.

The IEE described the activities to be implemented under IR3 as:

...concerned with strengthening the policy analysis and the development capacity of the Government of Sierra Leone through support for institutional capacity assessments, short-term training, technical assistance, information technology expansion, and related assistance to the diamond mining sector. The program will support the implementation of the Kimberly Process and promote local community involvement as a means of tracking diamonds from earth to export. It will also involve the provision of credit to exploited local miners to derive maximum benefit from their diamond winnings.

The IEE concluded that the credit component would trigger the need for an Environmental Assessment because of the general evasive nature of mining and need to characterize the extent of its impact to the environment. The IEE anticipated that through the EA analyses, appropriate credit conditionalities to ensure that these impacts would be minimized or mitigated would be established. The credit program is closely linked to other activities currently supported by USAID to MSI regarding the Peace Diamond Alliance.

PEACE DIAMOND ALLIANCE

Through the Peace Diamond Alliance Program operated by MSI, USAID has been assisting the Government of Sierra Leone with national policy to improve diamond management. PDA is working with government,

NGOs, traditional leaders and communities to craft new approaches for these stakeholders to gain control of their diamond resources. Key to the PDA program is to alter the incentive structure that currently fosters smuggling and to redirect these illegal activities within the formal diamond market place. Other goals of the Alliance include:

- Alternative credit scheme for miners,
- Promoting the fair trade diamonds,
- Improved capacity of the Ministry of Mineral Resources,
- Training opportunities for miners and diggers on the value of their production,
- Confronting child mining issues,
- Combating corruption,
- Improving the availability of technical and geological information and exchange,
- Responsible community relations and support,
- Improved environmental management,
- Facilitating the transition to more productive business sectors that are alternatives to mining,
- Sustaining the Alliance as vehicle for positive development in Sierra Leone.

The program, supported by PDA, involves a wide range of stakeholders in the sector, including diggers, license holders, dealers, exporters, the chiefdoms, government officials, local NGOs, and the community at large. PDA states that its programs prescribe to the following general principles in every of its activities:

- Local communities must benefit from the diamond resource,
- Accountability must be increased,
- Problems must be addressed simultaneously on local and international levels,
- Dialogue is essential, and
- Private sector must be part of a community-based solution.

PDA has recently invested significant time and resources toward the formation of cooperatives.

CONSULTATION WITH STAKEHOLDERS

Largely, the PES follows a similar FADE model used for most program development: Find, Analyze, Develop and Execute. Each step of this process requires at least some degree of stakeholder consultations to make certain that the assessment:

- Focuses on the right data and can locate available data sets,
- Recognizes stakeholder interests, the potential impact to the particular stakeholder, and the possible response of the stakeholder to such an impact,
- Considers alternative approaches to the proposed activity and degree of acceptance of those possible alternatives,

- Identifies the capacity of institutions to effectively implement, participate, and monitor, or
- Facilitates the opportunities to leverage the overall positive impacts of the proposed intervention or activity through any cross-linkage supports that may be appropriate.

During this PEA, the preparation team used both individual meetings and group meetings to gather data and vet ideas with stakeholders. Annex 8 provides a daily log of the various stakeholders met during the assessment as well as contact information. Unfortunately, we were unable to successfully make contact with all the organizations that we originally hoped to. Communications, timing, and logistics were huge constraints.

Four organized workshops were conducted during the preparation of the PEA. Following several days of individual consultations in both Freetown and the Kono mining district, the team hosted a consultation workshop in Freetown on January 19, 2005. Attendees were provided an overview of the issues and asked to help us with the PEA program. Box A presents the set of questions we put forth to the audience. A lively discussion of the areas of concern and possible approaches to mitigate the poor environmental practices of the artisanal mining sector followed.

On January 28, 2005, the team, assisted by the Peace Diamond Alliance project managed by MSI hosted a focus group discussion of two Chiefdom Mining Committees and a number of MMR mine wardens.

Again, with the assistance of the PDA, the team hosted a stakeholder workshop in Kono for each of the organizations represented in the Alliance, as well as four representatives from mining cooperatives being formed by the Alliance. The cooperatives selected for participation were the four finalists for a possible pilot credit project that PDA is trying to work out with non-USAID funding.

Finally, a stakeholder's workshop was held on February 2, 2005, to present the preliminary findings of the PEA exercise and provide additional opportunity for inputs as to how the team had thus far assessed alternatives, potential program conditionalities, institutional concerns, etc.

SIERRA LEONE BACKGROUND

BRIEF HISTORY

In 1787, British philanthropists founded the “**Province of Freedom**” which later became **Freetown**, a British crown colony and the principal base for the suppression of the slave trade. By 1792, 1,200 freed slaves from Nova Scotia joined the original settlers, the Maroons. Another group of slaves rebelled in Jamaica and traveled to Sierra Leone in the 1800s.

In 1806, the British formed an administrative body in Freetown and in 1807 established a naval base in Freetown’s port. The following year, 1808, Sierra Leone officially became a crown colony with the land possessions of Sierra Leone Company (formerly known as St George’s Bay Company) transferred to the crown. The colony was dedicated to demonstrating the principles of Christianity, “civilization,” and commerce.

With the passage of the Emancipation Act by the British Parliament in 1833, slavery was abolished in the territories of the Crown. By 1855, over 50,000 freed slaves settled in Freetown. Known as the Krios, the repatriated settlers of Freetown live today in a multi-ethnic country. Though English is the official language, Krio is widely spoken throughout the country, allowing different tribal groups a common language.

Sierra Leone obtained its independence from the British on April 27, 1961 and was declared a republic on April 19, 1971. Since independence, many changes have occurred politically, economically, and in the social arena of Sierra Leone.

Diamond mining in Sierra Leone began to take shape in the 1930s, after a significant find in the Kono District led to major alluvial mining activities by the Sierra Leone Select Trust (SLST) and a host of smaller companies and artisanal operators. In 1970, the government gained control of SLST and reformed it into the National Diamond Mining Company (NDMC). Within a few years, operations from the company began to decline and it ultimately ceased to be profitable.

The Siaka Stevens All Peoples Congress (APC) in power in Sierra Leone from 1968 until 1985 took control of small-scale diamond mining operations in Kono. The old colonial government railway line through the south and the east was dismantled by APC, apparently in an effort to limit its rival Sierra Leone People’s Party, (SLPP). This helped to secure better control of the Kono diamond fields for the exclusive use by the APC elites who dominated the northern territories. The absence of this rail line is a major impediment to economic and food security of the entire country today.

The 1990s brought successive civil disturbances culminating into a ghastly RUF rebel war that led to the intervention of the international community led by the United Nations Mission in Sierra Leone (UNAMSIL). Various international organizations helped provide an environment for free and fair presidential and parliamentary elections of 2002. The war has been officially over since 2002. There is much to do to rebuild Sierra Leone that lost much of what this poor country had as a result of the war and political instability.

UNAMSIL is preparing to close out its Mission to Sierra Leone and has been drawing down its activities over the last year. The closeout of this mission is likely to have serious short-term economic impacts on the country as the UN Mission and ancillary activities provide significant infusion of cash and jobs into the local economy.

Since independence, Sierra Leone has been ruled by 8 Heads of State, at one time making history in the world, of having the youngest Head of State, **Valentine Strasser** aged 27 years. Today a multi-party democracy operates under the presidency of Alhaji Dr Ahmed Tejan Kabbah who won a landslide victory in the May 2002 Presidential and Parliamentary Election. A major law on local governance was introduced in

2004 and the government is currently in the process of devolving many of the basic duties of government to the local level.

GEOLOGY AND ENVIRONMENT SETTING

Sierra Leone has an estimated population of about 5.2 million. A new census taken in December 2004 should soon provide urgently needed demographic profiles of the people. However, certain regions in the country carry the bulk of the population, including the Freetown Peninsula, Kono, Kenema and Bo Districts.

Sierra Leone, with a land area of approximately 72,300 square kilometers, is among the small countries in the Upper Guinea rain forest regime. It lies between latitudes 6° 55' and 10° 00' N and longitudes 10° 00' and 13° 17' W. The country shares borders with two other West African countries (Guinea and Liberia) and the Atlantic Coastline, which stretches approximately 400 kilometers long.

The climate is essentially tropical, with mean monthly temperatures around 26° C. Solar radiation is high, with high humidity occurring during the wetter months of the year. However, the cold and dry winds blowing across the Sahara Desert cause the humidity to be low and pleasantly comfortable during the months of December to February, which are essentially dry season months. Comparable cool months in the wet season are July and August. Distribution of rains varies considerably throughout the country. Around the Number Two River in the Freetown Peninsula, rainfalls of 5000 mm per annum have been recorded. There is a general decrease in rainfall moving from the coast to the interior, with the north receiving the lowest rainfall, a mean annual rainfall of 2000mm.

The climate of the diamond fields is wet tropical monsoon. The average annual rainfall is about 2500 mm overall, but it is generally a little higher in the southeast and a little lower in the north. The Kono region generally is cooler in the dry season than other parts of the country, temperatures dropping as low as 10° C in January.

The country is divided into four main relief regions: coastline, interior lowland plains, interior plateau, and mountains. The coastline or coastal plains is relatively gentle and comprised of estuarine swamps, terraces, alluvial plains, and beach ridges. The alluvial lowland plains extend from the coastal terraces in the west to the east of Sierra Leone occupying approximately 43% of the land area. At the edge of the lowland plains is the interior plateau, made up of granite that runs from the northeast to the southeast of the country. They seldom rise above 700m and are comprised of alluvial ironstone gravel in the southeastern region, while the northern end is comprised of weathered outcrops of granite rocks. In the north and east of the country are the Loma Mountains, the highest in West Africa. The highest peaks are Bintumani rising to 1945 meters and SanKan Biriwa on the Tingi Hills with an elevation of 1805 meters. West of these two mountains is the Freetown Peninsula, which also has several major peaks, the two highest being Sugar Loaf and Picket Hills.

With its high rainfall, Sierra Leone has an extensive system of rivers and swamps. Rivers attain maximum discharges in mid-September. River discharge is at its lowest in March and April, and begins to increase in May. Ground water levels do not rise significantly until late July. An estimated 5,000 square kilometers of wetlands and freshwater ecosystems have been recorded in the country. Fish is an important source of protein to approximately 70% of the population, but little information seems to be available on freshwater fisheries in the country's rivers and streams.

The swamps tend to be long and narrow, and are generally flanked by convex slopes. Actual widths vary considerably, but the average is about 80 meters, while longer lengths of individual segments are usually between 300 and 1,500 meters. It is rare for any part of the swamp network to be more than 1.5 kilometers from the perennial stream that it feeds. Within a swamp, the surface is flat and moist with typical soil patterns as follows:

- **0-1 meter** Black mud with a high content of organic debris

- **1-1.75 meters** Grey clay, silt, or sand
- **1.75 - 2 meters** Bleached angular quartz gravel, sometimes in a clay matrix
- **2 meters – below** Decompressed bedrock. Typically stiff white clay, containing kaolinite and sericite and irregular quartz granules after granite

Swamps constitute 80% of the drainage network in the diamond fields. Almost all first and second order drainage channels are swamps. Alluvial diamond mining sites are often colloquially referred to as swamps and, indeed, a large portion of them is within natural swamplands.

An estimated 200,000 to 300,000 hectares (on the order of half a million acres) of mangrove swamps fringes the coastline of Sierra Leone. Mangroves are restricted mostly to the four main estuaries that fringe the coastline of Sierra Leone. The mangroves of Sierra Leone have been studied mostly as a resource, rather than a place of extreme biological diversity.

Sierra Leone has about 650,000 acres of forest, game reserves, and national parks, and 70,000 acres of community forest. The original vegetation throughout the diamond fields was tropical rain forest, but over most of the region, the forest has been destroyed to make way for farming. Although approximately 70% of Sierra Leone was once covered with forest, the forested area today is somewhere around only 5%. Forests generally fall either in the category of *tropical moist evergreen or moist semi-deciduous forest*. Residual areas of primary forests remain where the population is sparse, that is in the Gola Forest in the extreme southeast. Deforested lands are farmed on the shifting cultivation system, and are normally covered with dense secondary brush whose height varies with the number of years that have elapsed since the ground was farmed. In the north, where rainfall is less, there are large areas where the secondary brush has been replaced by elephant grass, with shrubs and trees persisting only along the watercourses.

The country is rich in biodiversity with over 15,000 identified plants, 5,250 species characterized as useful plants. Forested lands support nearly 800 species of mammals and birds. Bolilands, which are depressions in the drainage areas of large rivers that flood in the rainy season and by March are dry grasslands again, are major areas for migratory waterfowl. The flooding and drying of the soil offers a wonderful environment for the tiny invertebrates, snails, and worms that the birds eat. However, bolilands are also attractive for rice cultivation.

Bush pigs (red ricer hog), bush cat, and leopards are found in the savannah grasslands of Sierra Leone. The palm nut vulture and the West African fish eagles are migratory birds commonly seen perched on tree sandbars. Hippopotamus, otters (river dogs), crocodiles, Nile monitor lizards are all common river species.

Marine fish stocks of Sierra Leone are the most diverse along the West Coast of Africa. Marine and coastal fish stocks can be classified into two broad categories, based on the biology and physical-chemical parameters of the environment. FAO (1990) recorded 237 species of fish for the West African region belonging to 108 different families.

MAJOR ENVIRONMENTAL CONCERNS OF SIERRA LEONE AND THE STUDY AREA

According to the 2003 Biodiversity Action Plan for Sierra Leone, the major threats to biodiversity in the country are from unsustainable practices of agriculture, livestock farming, forest exploitation, fishing, energy production, mining, infrastructure development, and waste disposal.

Of the large wildlife living in the Savannahs (elephants, leopards, hyenas, duikers, genets, civets, warthogs, aardvarks, chimpanzees, baboons, monkeys, etc.), many are listed as vulnerable and an increasing number threatened as endangered. There are 15 primates, all of which are either endangered or vulnerable. Of the 18

antelopes, two are extinct and the other 16 are threatened. Other mammals like elephants and hippos have been drastically reduced.

Biological diversity in Sierra Leone is faced with a variety of threats, including logging for timber; fuel wood, charcoal and poles extraction; trade in bush meat and pets; slash-and-burn agriculture; mineral exploitation; civil conflict; over-fishing of marine resources; ill-conceived policies; conflicting mandates; and poverty.

The lack of cheap and affordable electricity and fuel puts immense pressure on the forests to supply fuel wood and charcoal produced from such fuel wood. An estimated 85% of the Sierra Leonean population is dependent on the use of fuel wood and charcoal for domestic heating and cooking. Most of the coastal mangrove swamp forests have become depleted as demand for wood for fish smoking and evaporation of salt has spoiled vast areas of former prime mangrove swamps.

Bush meat and Pets: Bush meat from wildlife is an important protein source and is part of the diet of some of the rural and urban populations. The demand for this meat is increasing in some regions and it provides some people with a considerable amount of income. Hunting is exacerbating concerns about threatened and endangered species. Poaching in protected areas appears to be increasing dramatically. Recent surveys point to the near extinction of the red colobus monkey.

Another major issue threatening species is the capture of wild animals for the pet trade. Despite legislation prohibiting the capture of chimpanzees (endangered in West Africa) as pets, they are the primary targets of this trade. Laws are not enforced and the population of wild animals continues to be depleted.

Slash-and-burn Agriculture: Slash-and-burn agriculture has been blamed for the large-scale deforestation of Sierra Leone's forests and continues to degrade the remaining forest as fallow periods fall with increasing human population. On some of the most difficult terrains (steep slopes), farmers stake claims to land for the cultivation of crops. Erosion from poor agricultural management is a continual problem and contributes to the instability of some of the habitat necessary to maintain biological diversity. Much of the farming extends to riverbanks and contributes to excessive siltation of freshwater streams and rivers. Secondary bush vegetation arising from the slash and burn activities is increasingly dominant in areas without active agricultural activity.

Mineral Exploitation: Sierra Leone is rich in mineral deposits in almost all of the ecosystems and all these have been under either artisan or industrial scale mining schemes at one time. Diamonds, iron ore, rutile, bauxite, gold, granite, and platinum are some of the minerals under active exploration or production. In most forested areas of the south and east of the country, artisanal mining of diamonds, and to a lesser extent, gold, also results in the exploitation of wildlife from an increased demand for bush meat to feed the swelled populations. The operations of many of the mining companies in the past were not subjected to environmental controls and remnants of tailings piles, waste rock, and altered hydrogeology continue to stress the natural habitat. Deforestation, siltation, and displacement of human population are also major factors that may be impairing the biological diversity of the country.

Civil Conflict: During the past decade, Sierra Leone went through a bloody civil war with devastating impacts on human lives, infrastructure, and the environment. Illegal logging activities in all protected areas increased and brought with it the attendant problem of creating easy access to remote parts of the forest for hunters. Trade in wild animal pets involving chimpanzees rose as did the demand for bush meat in most urban centers. The large number of displaced and unemployed refugees eked out a living by exploiting forest resources at unsustainable levels. Marine Resources were also over exploited. In the Outamba Kilimi National Park, a large herd of buffalos, primates, and hippos were reported slaughtered, while in the Gola rainforest, illegal logging activities are reported to be going on at an alarming rate.

Over-fishing of Marine Resources: Sierra Leone's marine resources, particularly fishes and shrimps, are under immense pressure for over-exploitation, with many raising concern about the long-term sustainability of current exploitation levels. Artisanal fishing has also come under fire for unsustainable practices involving the use of beach seine netting. The mesh sizes involved are small (usually less than 25 mm diagonal stretch

length) and are considered illegal by Sierra Leonean law. They are extremely detrimental to marine resources as they take even the smallest fishes and shrimps that could have grown up to form the next breeding population.

Box A. Excerpt from the National Long-Term Perspectives Studies, Sierra Leone Vision 2025: “Sweet-Salone,” August 2003, Government of Sierra Leone

2.6 The Environment

Sierra Leone is presently faced with the problem of environmental degradation, arising mainly from demographic, economic, and social pressures. Poor economic performance, rapid population increases, migration, and poverty have led to increasing demands on the physical environment with consequences of rapid deforestation, land degradation, and uncontrolled exploitation of natural resources. Box 2.4 shows selected indicators on the physical environment and some of the damages caused.

Deforestation accounts to a large extent for the environmental degradation in the country. The traditional farming practice of shifting cultivation, with declining fallow periods, have over the years left vast expanses of land deforested in much of the country. It is estimated that 600,000 hectares of forested lands (or 8% of total arable uplands) have been cleared for farming. The problem is further exacerbated by the overwhelming dependence of the population on fuel wood as the main source of energy for cooking and in cottage industry. About 4 million cubic meters of wood biomass is extracted annually to meet domestic energy needs. While uplands continue to be the principal source of fuel wood and construction materials, mangroves along the coastal areas are being increasingly exploited for fuel wood, boat construction, and rice cultivation. This has led to increased exposure to storms and destruction of natural breeding grounds for marine and estuarine fish and other organisms.

In the northern region of Sierra Leone where 60% of the cattle and small ruminant population is concentrated, over 8,300 sq km of land has been left bare due to overgrazing. There are no attempts at any form of range and pasture management; bush fires continue to affect about 200,000 hectares of savannah woodlands annually. Thus, overgrazing and annual bush fires have caused an apparent ecological change from savannah woodland to grassland in the cattle rearing areas.

Mining activities, particularly in the eastern and southern regions, have also left vast areas deforested and degraded. It is estimated that between 80,000 and 120,000 hectares have been mined in different parts of the country with minimal efforts at reclamation. The uncontrolled exploitation of mineral resources, coupled with the absence of mitigating policies and conservation programs over the years, has resulted in devastating environmental consequences.

Table I. Indicators of Environmental Sustainability

Selected Indicators of Environmental Sustainability in Sierra Leone

Proportion of Population Depending on Fuel Wood as Main Energy Source	95%
Total Area of Forests and Water Resources (1990):	19,000 Sq Km
Annual Deforestation (1981-1990)	100 Sq Km per annum 60% of Total Forest Area
Current Deforested Area	87% of Total Forest Area
CO2 Emissions from Industrial Processes (metric tons):	400,000 to 600,000 Mt
Annual Freshwater Withdrawal (1970-1994)	0.4 Cu Km 20% of Total Water Resources

Source: UNDP Human Development Reports 1995-2000.

OTHER HEALTH AND SOCIAL FACTORS

Information provided by the 2003-2004 Sierra Leone Income and Household Survey indicated that poverty is pervasive and deep in Sierra Leone. The National Poverty Line was established at 2111 Leones per day, resulting in a national poverty head count of about 70%, with 26% regarded as extreme poverty. Table 2 below presents key social and health indicators taken from the 2004 World Bank update on the Sierra Leone country profile.

Table 2. Poverty and Social Indicators

Poverty and Social Indicators (2003 data) From the World Bank 9-15-04	Sierra Leone	Sub-Saharan Africa	Low-income
Population, mid-year (millions)	5.3	703	2,310
Urban population (% of total population)	39	36	30
GNI per capita (Atlas method, US\$)	150	490	450
GNI (Atlas method, US\$ billions)	0.8	347	1,038
Average annual growth, 1997-2003			
Population (%)	2	2.3	1.9
Labor force (%)	2.2	2.4	2.3
Health			
Life expectancy at birth (years)	37	46	58
Infant mortality (per 1,000 live births)	165	103	82
Child malnutrition (% of children under 5)	27		44
Access to an improved water source (% of population)	57	58	75
Illiteracy (% of population age 15+)		35	39
Gross primary enrollment (% of school-age population)	79	87	92

The majority of houses in the region had been badly damaged or completely burned during the war. The National recovery plan for Sierra Leone reported that 94% of all shelter in the Kono District was destroyed by the war. The figures for damaged shelter in Tongo appear to be somewhat comparable.

At the time of the Cemmat's survey, 95% of the households lived in dwellings made of mud walls, the remaining 10% made of concrete. Floors in 76% of the households were dirt. Corrugated metal roofs were on 82% of the houses, tarpaulin 15 % and the rest were thatched roofed houses. The average household size was 8.1 persons, with a median age of about 23 years old.

The study area contained 19 educational institutions, including 12 primary schools. Only a few schools had been renovated and most were still suffering from the damages incurred during the war.

Health facilities in the area consisted of 18 pharmacies, 7 maternal health units and two primary care centers. There is no hospital in the region, the closest being the Kenema Hospital that is about 1-2 hours away by road in good weather and sometimes completely inaccessible during the rainy season.

Clean and safe drinking water is extremely limited in the area. There are an estimated 267 wells that supply the basic needs of the study communities but these wells are further supplemented by rainwater catchment during the rainy season. Although 76% of the wells are categorized as protected, cross contamination is rampant and water-born diseases are increasingly regarded as the major health problem for the region.

Respondents to the survey indicated that wells were located an average of 12 minutes away from their households.

Open pit latrines are the principal means of disposal for human excreta, but the significant majority of these latrines are either damaged or poorly maintained and pose significant health threats through cross-contamination of drinking waters or surface waters having human contact.

Gross mismanagement of refuse represents a huge health problem in the region. Although some households indicate they do composting, many more indiscriminately dump waste on the land or in streams. The burning of refuse helps to control some of the vectors, but contributes to what is a remarkably poor air quality for a substantially rural area.

About two-thirds of the households indicated that they owned land for farming and about 79% said they held land for mining. Thirty-seven percent of respondents claimed that their major household occupation was mining and 32% indicated farming. Many of these households also practiced both mining and farming to supplement their incomes. Access to capital was stated as the primary constraint to increasing their income for either mining or farming.

The main livestock owned and reared in the study area are goats, sheep, chicken, and ducks. The most common of these are chicken, which are reared by every household in the study area, with an average of 12.6 chickens per household. The main goal for rearing these livestock is to augment both the household food and cash requirements.

There is virtually no telephone service in the area and communications are through word of mouth. Road maintenance seems almost a foreign concept as do simple drainage modifications that would improve access, particularly in the rainy season. Electrical power is generally limited to those few households that have generators. Consequently, very few households have assets such as radios or television sets. Basic furniture like beds, chairs, and tables, are also absent from a large portion of the households.

Although only a handful of the households reported having ex-combatants, most households stated that they were displaced during all or part of the 11-year war period.

The ethnic and religious makeup of the population is varied. There are 12 mosques and 7 churches in the Tongo mining area and representation of six main ethnic groups: Mende, Temne, Limba, Kono, Fula and Madingo. About 58 percent of the household heads are Mendes and the predominant dialect of the region is Mende.

As part of Cemmat's survey, respondents were asked to identify the most common mining problems they were encountering. Following is a summary of their main concerns:

- Illicit diamond mining, which is a serious threat to the operations of License Holders;
- High cost of fuel, rice and other materials is creating many problems in the normal process of mining;
- Difficulty in getting people to support license holders;
- Multiple supporters put miners in a dilemma regarding who to sell diamonds to;
- Miners owe little or no allegiance to bush owners, due to lack of support from bush owners;
- Diamond theft;
- Lack of firm agreement among various stakeholders in the alluvial diamond mining industry;
- Ignorance of the physical characteristics that determine the price of diamonds;

- The price paid by supporters to miners is small. Therefore miners tend to declare a small part or none of the diamonds they get;
- No rehabilitation of mined out areas after mining. The PDA is trying to get rehabilitation funds from the government so that mined out areas can be rehabilitated;
- Re-mining of rehabilitated areas.

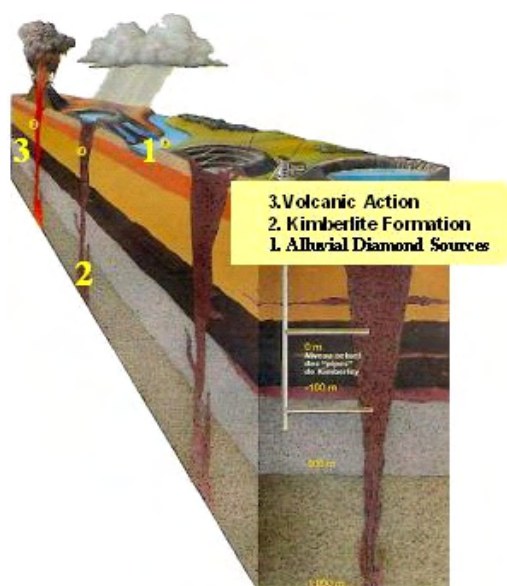
DIAMONDS

Sierra Leone is ranked among the 19 diamond producing nations and has 60 years of active diamond production. The discussion below will examine the overall alluvial diamond activity and how the sector in Sierra Leone operates.

DIAMOND OVERVIEW

Diamond is a polymorph form of carbon. Time, very high temperature (around 1,000 degrees) and very high pressure brought about the formation of the diamond crystals toward the mantle of the earth.

Figure 1. Diamond Formation



Primary deposits

Diamantiferous kimberlite pipes are often referred to as "Primary deposits." Diamonds in these deposits were moved to the earth's surface by the magma pushing up the kimberlite (diamond bearing rock). When it reached the surface, a volcanic eruption occurred. Kimberlite pipes may have been formed in this process and additional diamond bearing kimberlite may have remained in the cracks of the earth crust crystallized as dykes.

Secondary deposits

The secondary deposits are formed by the weathering of the kimberlite and the release of the diamond stones from the rock. The stones can be transported in the alluvial river sediments (sometimes glacier movements) hundreds of kilometers from the original kimberlite source. Since many of these old transport channels have evolved over time, alluvial diamonds are found in all sorts of environments: river beds, beach sands, old river beds (sometime found on top of hills deep jungle forest, deserts, etc.)

Mining of the kimberlite formations is generally undertaken on an industrial level in order to address the need to excavate and process massive amounts of ore materials to extract the precious stones being sought. Significant investments in capital are necessary to even begin the exploration process to determine if the production of diamonds is cost effective and manageable.

Processing of ores essentially involves the steps of:

- Crushing;
- Screening to grade materials for separation of waste rock from high grade materials containing diamonds;
- Washing disaggregated muds from ore;
- Additional concentrating of high-grade materials using rotary mixers, agitators, jigs, cyclones, cones, heavy-media separators, etc.; and

- Final separation, generally visually done, but with tools such as grease tables or x-ray separators to assist in the process.

On the other hand, alluvial mining is done on a range of scales, from very large processing plants to hand excavation and sorting techniques. Since weathering has largely already separated the diamonds from the ore, the problem is generally one of looking through the massive amounts of alluvial material to find the extremely small portion which are diamonds. Highest-grade ores can be in the order of one carat per cubic meter of materials. High production alluvial mining needs heavy equipment and dredges to process volumes of alluvial sands and gravels.

The simplest techniques are defined as artisanal mining, but with no uniform definition of this term, artisanal mining has vastly different meanings in different countries. Artisanal mining is labor intensive and employs the most rudimentary materials: shovel, picks, sieves, pumps, etc. The UK DfID diamond advisor to Sierra Leone suggested that an appropriate definition of artisanal mining would include a maximum depth allowable as well as a prohibition on any mechanized movement of the alluvial materials. The maximum depth would be established based on safe operating conditions for the miners and reduction of any potential side slope stability failures. Without good data, it is unclear how often such failures might occur, but it is quite clear that safety and knowledge of soil dynamics are given little prominence at the artisanal mining sites visited.

In summary, artisanal mining can be characterized as having the following features:

- Generally a subsistence industry for the actual miners and therefore associated with poverty and a hope to 'get rich quick';
- The absence or low degree of mechanization and chemicals;
- Generally labor intensive and requiring no skills;
- Low safety standards;
- Poorly trained, often illiterate personnel;
- Inadequate capital;
- Some illegality due to refusal to acquire mining rights and excessive trespassing;
- High production of waste materials due to low recovery;
- Often in conflict with subsistence agricultural activities or productive alternative land uses;
- Very little consideration for environmental issues; and
- High exposure to risk and health hazards.

The diamond sector was once the mainstay of the domestic economy, and may still be a necessary bridge to maintain some degree of social and economic stability in the country. However, it is evident that the sector has also been extremely detrimental to the welfare of the country. According to a British government report, "From the late 1970s onwards, the diamond trade became increasingly dysfunctional and dominated by corrupt practice and poor policy. By the 1990s, the diamond industry had not only ceased to serve the needs of the country, but had become a motor for its destabilization and collapse into civil war."

Immediately following the return of peace to Sierra Leone, artisanal mining quickly reverted back to its pre-war diamond mining or marketing structure. If anything, the war has aided and further consolidated the stranglehold that the cartel maintains over the diamond sector. Many are concerned that the diamond sector continues to be a powder keg that could explode into a future civil war unless it is brought under better control soon.

Among the 19 diamond producing countries, in 2003, Sierra Leone ranked 14th (less than 0.3% of total production) in the extraction of jewelry quality stones and 8th (just over 0.4% of the total level) in the production of industrial diamonds. At 512,000 carats, Sierra Leone ranked 12th (about 0.3%) in overall world production in 2003. Although Sierra Leone's production in total carats in 2004 increased overall by about 36% to 696,000 carats, this was not enough to significantly alter the country's relative rankings for production. This is also in contrast to the peak diamond production of the country in the 1960s of about 2 million carats per year. Table 4 lists the 2004 production levels in Sierra Leone, as recently reported by the Government Gold and Diamond Office (GGDO). The GGDO was a semi-autonomous division of the Ministry of Mineral Resources, but has now become part of the National Revenue Authority (NRA). The GGDO is responsible for the valuation of diamonds for export purposes, tracking exports and ensuring compliance with the international certification process known as the Kimberly Process.

Table 3. Producer Countries: Year 2003 (carats)

Countries	Gem Diamond	Industrial Diamond	Total
Angola	4,770,000 [90%]	530,000 [10%]	5,300,000
Australia	14,900,000 [45%]	18,200,000 [55%]	33,100,000
Botswana	22,800,000 [75%]	7,600,000 [25%]	30,400,000
Brazil	500,000 [94%]	30,000 [6%]	530,000
Canada	11,200,000 [100%]	0 [0%]	11,200,000
Central African Republic	300,000 [75%]	100,000 [25%]	400,000
China	235,000 [20%]	955,000 [80%]	1,190,000
Coast-ivory	205,000 [67%]	102,000 [33%]	307,000
Democratic republic of Congo	5,400,000 [20%]	21,600,000 [80%]	27,000,000
Ghana	800,000 [80%]	200,000 [20%]	1,000,000
Guinea	368,000 [75%]	123,000 [25%]	491,000
Liberia	36,000 [60%]	24,000 [40%]	60,000
Namibia	1,650,000 [100%]	0 [0%]	1,650,000
Other countries	24,000 [26%]	67,000 [74%]	91,000
Russia	12,000,000 [50%]	12,000,000 [50%]	24,000,000
Sierra Leone	214,000 [42%]	296,000 [58%]	510,000
South Africa	5,070,000 [40%]	7,600,000 [60%]	12,670,000
Tanzania	198,000 [85%]	35,000 [15%]	233,000
Venezuela	30,000 [38%]	50,000 [63%]	80,000
Zimbabwe	0 [0%]	0 [0%]	0
World production	80,700,000 [54%]	69,512,000 [46%]	150,212,000

Sources, references: [USGS](#) (US Geological Survey) and [ABARE](#) (Australian Bureau of Resource and Agricultural Economics).

Although there are several large companies currently involved in diamond prospecting and exploration activities in Sierra Leone, only one company is currently extracting minerals under its lease arrangement. Koidu Holdings has two well-defined kimberlite pipes and several dykes being developed. The 2004 production information in Table 4 represents the level of production from pipe 1 that at the time of the

assessment visit was the only kimberlite formation that was being processed. Although all these companies have produced very enthusiastic promotional materials to attract investors, there is wide speculation as to how good the mineral formations might be and if they could be economically mined. Most of the business plans for these companies also indicate that they intend to extract any alluvial stones which might be in their mine lease areas.

Under the Mining code, only native Sierra Leoneans are eligible for artisanal licenses and the maximum area that can be mined is 5 acres. If the mining area is more than 5 acres, but less than 25 acres, the mining operation is categorized as small-scale mining and subject to slightly more restrictive standards. Additionally, small-scale licenses can be issued to co-operatives, corporations, joint ventures, or partnerships, if there is at least 25% Sierra Leonean ownership and the total mining area is 25 acres or less.

The Ministry of Mineral Resources has stated that less than half a dozen small-scale licenses are currently in effect. The Ministry of Minerals Resources is the agency responsible for licensing and regulating all aspects of the diamond production cycle. The Ministry issues 6 types of mineral rights:

- Exclusive Prospecting Licenses – effective up to 5 years;
- Non-Exclusive Prospecting Licenses – effective up to 5 years;
- Exploration Licenses – effective up to 5 years;
- Mining Leases – effective up to 25 years with additional opportunity for renewal;
- Small-scale Mining License – in practice issued for one year with opportunity for renewal; and
- Artisanal Mining License – in practice issued for one year with opportunity for renewal.

Overall, the estimated government of Sierra Leone revenues from the diamond section in 2004 was as follows:

Table 4. Estimated 2004 Sierra Leone Government Revenues from Diamond Sector

Source	Estimated Amount
Export Tax (3% assessment of alluvials)	\$ 3,360,000
Export Tax (5% assessment of kimberlites)	700,000
Exporters license fees	400,000
Dealers license fees	318,200
License Holders fees	759,000
Agents License fees	524,000
Mining and Exploration Licenses	900,000
Tongo Field Tender Submission Fee	50,000
Artisanal License Fees	87,000
Artisanal Monitoring Fees	44,000
Artisanal Mining Income Tax	84,600
Total Estimated Revenue	\$ 7,226,800

ARTISANAL MINING IN SIERRA LEONE

According to GGDO figures for 2004, 89% of the volume (by weight) of Sierra Leone diamond exportation was from alluvial sources, with artisanal mining operations constituting all but a small fraction of this volume.

Generally, there seems to be close comparability between the prices of the alluvial and the kimberlite stones, but there is really no way to establish any pricing patterns from the information provided. For purposes of analysis done under this Programmatic Environmental Assessment, it is assumed that the export levels are equivalent to the actual production in 2004.

The key players in the artisanal mining sector in Sierra Leone are the diggers, license holders (sometimes referred to as miners), supporters, dealers and exporters. The license holders generally operate within an integrated system of supporters, dealers and exporters, that require them to sell their produced stones (typically referred to as winnings) exclusively to specific licensed dealers/agents or to exporters as directed by the supporter. These license holders are financially dependent on their supporters and effectively prevented from using the market place to establish reasonable and competitive prices for their production. Because small-scale licenses are restricted to native Sierra Leoneans, the license holder is fronting for the external supporter who essentially controls the entire operation.

Dealers often play an active role in the management and supervision of mining work, either personally or through employed mine managers, mostly to protect their investments and assure that the produced stones are not diverted to smuggling channels or to rival dealers.

Licensed exporters process the diamonds through the formal export procedures. Most of the licensed exporters are foreign nationals. In principle, the exporters are not to have any direct involvement in mining or the related support activities; however, in actual practice they are believed to be a major source of funds for mining.

Most of the license holders and diggers we spoke to referred to a 1/3 split arrangement between the license holder, the diggers and the supporter. However, dealers spoken to that acknowledge their role as supporters suggested that it was more common for them to negotiate some sort of 60-40 or 70-30 split arrangement between the license holder and the supporter after all expenses were taken out. With many of the arrangements being done informally and the level of secrecy that everyone tries to maintain with regard to the sector, the lack of transparency of these operations is an impediment to rationalization of the sector.

Table 5. Average Rate of Return of an Artisanal License

(Gross – before all costs including dealer and exporting costs)

Total License Holder Share (USD)	Total Number of Carats	Number of License Holders	Average Number of Carats	Average Revenue/License (USD)
\$112,793,045	612,699	2300	266	\$49,040

Other mining stakeholders include the paramount chiefs (who own the land, collect surface rents, and in some cases grant mining rights), the Ministry of Mineral Resources (which owns the mineral rights, issues the mining license, and regulates the industry), and the “gangs” of diggers (who constitute the main labor force).

As of the end of 2004, there were approximately 2300 active artisanal mining licenses issued by the Ministry of Mineral Resources, approximately half of these issued in the Kono District. It is also known that there are a large number of illegal (i.e., unlicensed) operations throughout the country, but estimates of the degree of illegal mining vary dramatically.

Small-scale operations typically involve the digging of pits within alluvial river channels and excavating for black sands that are associated with diamond bearing gravels. As many as 100 men might work on a one acre site. The diggers use shovels to extract the target gravel that is most often carried off in pans or sacks to an area where the gravels are washed using a sieve (approximately 1 meter in diameter, typically with an eighth of an inch mesh).

ARTISANAL MINING LICENSING AND REGULATION

The basic procedure for obtaining a small-scale artisanal license is as follows:

1. License applicant generally obtains a supporter to fund all aspects of the project.
2. The applicant seeks the local Chiefdom approval of a specific mining plot and the Paramount Chief forwards the request to the Chiefdom Mining Committee (CMC) for their recommendation on approval. The Chief is recognized as the approval authority for this authorization.
3. Immediately following the authorization from the Chief for use of the plot, the applicant is required to pay surface rent and chiefdom development fund fees.
4. As a matter of practice, the applicant takes the receipt of fee payment to the Ministry of Mineral Resources local warden representatives for further processing of the application. The Warden accompanies the applicant to the proposed mine site to mark boundaries. Applicant pays the Warden a fee (approximately 30,000 Leones) for this mine plan.
5. The Mine Plan is submitted to the Paramount Chief for approval at which time the Government Mines Engineer signs the plan.
6. At this point, the miner forwards the application to the Ministry of Mineral Resources, pays additional fees, and obtains the license. As a matter of practice, the MMR Government Mining Engineer for the District is the one that decides on the issuance of the license. The permit holder can now proceed with actual mining activity and will need to mobilize diggers, tools, and other logistics.

The application for an artisanal mining license requires the applicant to include a reclamation plan as well as provide financial information regarding how operation of the mining activity will be supported. From all indications neither of these requirements is normally submitted with the application and that failure to provide such information is routinely overlooked by both the Ministry of Mineral Resources and the Chiefdom in the license approval process.

Box B provides the text of the regulations governing the granting of an Artisanal Mining License.

Box B. Part VIII – Artisanal Mining Licenses

73. (1) Where an area has been declared an area for licensing for artisanal mining operations under section 20 the Secretary of State may, in respect of that area and in relation to the minerals prescribed, of this Decree which would otherwise apply for exploration or mining operations in the area for the minerals prescribed.
- (2) Nothing in subsection (1) of this section shall be read or construed as authorizing anything to be done which has the effect of modifying or extinguishing the rights of any person holding a mineral right over a declared area or any part thereof.
74. (1) Any person who wishes to carry out artisanal exploration and mining operations shall apply for an artisanal mining license.
- (2) (a) An artisanal mining license shall be granted
- (i) in the case of an individual only to a citizen of Sierra Leone;
 - (ii) to a co-operative society registered in Sierra Leone;
 - (iii) to a joint-venture or partnership registered in Sierra Leone;
 - (iv) to a body corporate that is incorporated and registered in Sierra Leone.
- (3) All such co-operatives, joint-ventures, partnerships and bodies corporate shall be required to register with the Director of Mines and will be required to provide further documentation as may be required by the Director of Mines.

Box B. Part VIII – Artisanal Mining Licenses

75. (1) An application for the grant of an artisanal mining license application shall be made to the director and be in such form as may be prescribed.
- (2) An application for the grant of an artisanal mining license shall
- (a) state the full name of the applicant and in the case of a partnership or other association of persons the full names and nationalities of all such persons and in the case of a body corporate the registered name of such body and particulars of its shareholders;
 - (b) identify the mineral in respect of which the license is sought;
 - (c) identify mine area in respect of which the license is sought;
 - (d) be accompanied by a statement giving particulars of the capital and experience available to the applicant to conduct exploration and mining operations of the mineral efficiently and effectively, and
 - (e) may set out any other matter which the applicant wishes the Director to consider.
76. (1) The Director may, subject to section 16 of this Decree and regulations may under it, grant or refuse to grant artisanal mining licenses.
- (2) Any person aggrieved by the refusal of the Director to grant him the license may appeal to the Secretary of State, whose decision shall be final.
77. (1) The area covered by an artisanal mining license shall not exceed three hundred and fifty yards in length or three hundred and fifty yards in width unless otherwise prescribed
- (2) The area covered by an artisanal mining license shall be demarcated by an authorized officer in such a manner as may be prescribed or as the authorized officer may, in the circumstances consider suitable.
78. (1) Subject to the provisions of subsections (2) and (3) an artisanal mining license shall be valid for such period, not exceeding three years as the Director may determine and may on application made to the Director be renewed for further periods not exceeding two years at a time.
- (2) The Director may revoke an artisanal mining license if
- (a) he is satisfied that, in case of an individual, the holder has entered into an arrangement with a person who is not a citizen of Sierra Leone the effect of which is a transfer to that person the benefit of such license, or in the case of a body corporate the holder is no longer a body corporate of which at least fifty one per cent of the beneficial ownership is held by citizens of Sierra Leone;
 - (b) within a period of two years no mining operations have commenced under the said license or its renewal.
- (3) An artisanal mining license shall not be renewed pursuant to subsection (1)
- (a) if the land in the licensed area has ceased to be an area declared for artisanal mining operations;
 - (b) in respect of any mineral which has ceased to be a mineral prescribed for artisanal mining operations;
 - (c) unless the Director is satisfied that the applicant has carried on, in good faith, within the limits of his competence and resources, exploration or mining operations in the licensed area and intends to continue doing so;
 - (d) if the applicant has not carried out effective rehabilitation and reclamation of his mined out areas to the satisfaction of the Director and authorities responsible for the protection of the environment or paid the prescribed fee; or
 - (e) if the applicant is in default and the Director is not prepared to waive the default.

Box B. Part VIII – Artisanal Mining Licenses

79. (1) The holder of artisanal mining license has the right to enter his licensed area and, subject to this Decree, the regulations and the conditions of the license, the exclusive right to explore for and mine in the area, and to remove minerals from the area and dispose of the mineral in respect of which the license was issued.
- (2) The holder of an artisanal mining license shall
- (a) within the limits of his competence and resources carry on, in good faith, in the licensed area exploration or mining operations;
 - (b) furnish the Director with such information relating to his exploration or mining operations as the Director may reasonably require or may be prescribed;
 - (c) carry out promptly any directives relating to his exploration or mining operations which may be given to him by the Director for the purposes of ensuring safety or good mining practices;
 - (d) if not personally supervising the exploration or mining operations under the license employ a Mines Manager for the purpose of supervising the exploration or mining operations; except that all such Mine Managers must be “ approved by the Director and shall carry with them such means of identification as the director may direct;
 - (e) before beginning or ceasing any exploration or mining operations notify the appropriate local authority and an authorized officer of his intention to begin or cease exploration or mining, as the case may be;
 - (f) employ in the area in respect of which the license is issued not more than fifty laborers or tributers under one license;
 - (g) sell the minerals obtained in his mining area as prescribed;
 - (h) carry out rehabilitation and reclamation of mined out areas;
 - (i) keep accurate records of his winnings and such records shall be produced for inspection on demand by the Director or a duly authorized officer.

An additional requirement of the current licensing law is that the applicant shall not receive any renewal of a permit:

if the applicant has not carried out effective rehabilitation and reclamation of his mined out areas to the satisfaction of the Director and authorities responsible for the protection of the environment or paid the prescribed fee;...

This provision re-enforces the notion that the applicant is strictly liable for reclamation of the site as consistent with the Ministry’s position for all other mining activities. However, because the license fee for artisanal mining includes a ‘rehabilitation fee,’ it has largely assumed by the artisanal mining license holders that the Government has assumed responsibility for this requirement. Unfortunately, it was clear from discussions with Ministry representatives that they are largely unfamiliar with any of the provisions relating to environment.

Table 6 provides a comparison of the general aspects of the Sierra Leone Minerals Code with those of several other African nations and Peru that also support a large artisanal mining industry.

Table 6. Parameters for Comparison of Mining Legislation

Country	Mineral Right Category	Tenure Period (years)	Concession Size (acres)	Renewable	Assign / Transfer	Restricted to Locals	Can be Mortgaged
Ethiopia	Small-scale Mining License	10 or life of deposit	- Reasonable for the operations - 20,000 m ²	<= 5-year Periods	Yes (may be inherited)	Yes	Not specified
	Artisanal Mining Licenses	1	5,000 – 10,000 m ²	Indefinite 1-year periods			
Ghana	Small-scale Gold Mining License	3-5	3 – 25 acres	Periods of 3 – 5 years	Discretion of the Minister	Yes	Not specified
Ivory Coast	Small-scale Mining Authorization	2	25-100 hectares	2-year periods	No	Yes	No
	Semi-Industrial Authorization						
Sierra Leone	Artisanal	1	5 acres or less	11	No	Yes	No
	Small Scale		5-25 acres			25%	
Tanzania	Primary Prospecting License	1	<= 110	1-year Periods	-	Yes	-
	Primary Mining License	5	<= 10	5-year Periods	Yes		Yes
Zambia	Small-scale Mining License	10	<= 400	Yes			
	Artisanal Mining Right	2	<= 5	No	Unspecified	Not specified	Not specified
	Gemstone License	<=10	<= 400	Yes			
Peru	Artisanal Mining Right	As long as the standing fee is paid	100 – 1,000	-	No (may be inherited)	Not specified	Yes
	Small-scale Mining Right		1,000 – 2,000		Yes (may be inherited)		Yes

The cost of obtaining an artisanal mining license is summarized below in Table 7. During the in-country visit, the MMR raised the price of the license, an action that brought significant complaining from many of the license holders and diggers whom we met during the study.

Overall, the cost of obtaining a license through January 2005 was approximately US \$200 for a one-acre plot. Effective February 1, 2005, the cost was increased to over US \$300 for a one-acre plot.

License fees for small-scale miners who either do not meet the 100% indigenous owned rule or whose claim is more than 5 but less than 25 acres is slightly more. MMR indicated that there were few small-scale licenses that had been issued. However, the team was consistently advised that there were several operations, particularly ones using heavy equipment like bulldozers and or draglines that were operating under artisanal licenses issued by the MMR and subsequently inspected with no change in status.

While Table 7 summarizes the normal costs of obtaining the license, it is customary to make additional payments or bribes that can multiply the actual cost of obtaining the license by two or three times.

Table 7. Cost for Small Artisanal Mining License

Estimated Fixed Annual Cost Requirement for Small Artisanal Mining License

(cost as of 1-18-05 – fee increase believed pending – \$1 = 2,800 Leones)

		Price in Leones	Dollar Equivalent
Artisanal Land and River License <i>(increased to 200,000 Leones effective February 1, 2005)</i>	Per acre per year	100,000	\$35.72
Mine Manager's Certificate ¹	Per year	50,000	\$17.86
Monitoring Fee <i>(increased to 100,000 Leones effective February 1, 2005)</i>	Per year	50,000	\$17.86
Rehabilitation Fee ² <i>(increased to 200,000 Leones effective February 1, 2005)</i>	Per acre per year	100,000	\$35.72
Surface Rent <i>(increased to 100,000 Leones effective February 1, 2005)</i>	Per acre per year	50,000	\$17.86
Chieftom Fee	Per year	70,000	\$25.00
Additional Income Tax	Per year	96,000	\$34.29
TOTAL	Per year	516,000	\$184.29
TOTAL AS OF FEBRUARY 1, 2005	Per year for 1 acre	866,000	\$309.29

The license approval and monitoring responsibility is vested in both the Paramount Chief and the Ministry of Minerals Resources. The licensing requirements specify that the applicant must gain the approval of the Paramount Chief responsible for the land prior to completing his application with the Ministry of Mineral Resources. After the Chieftom grants its approval, the Ministry completes processing of the application. Although it is not specified within the law and it does not appear that any specific implementation guidelines elaborate this process, the team understands that the Government Engineer for the District actually issues the permit and transmits the approved document to the central Ministry office in Freetown well after any decision has been made.

The Chieftom Committees play an important role in the artisanal diamond sector. They advise the chiefs on allocation of licenses and monitor all mining activities in the Chieftom including the identification of any illegal mining that is going on within the Chieftom. The responsibilities of these committees include the identification of diamond plots, overseeing the acquisition of licenses and extraction of diamonds. The Paramount Chief chairs the Committee.

Mine Wardens working for the Ministry of Mineral Resources have been placed in all diamond regions of the country. The Wardens survey and demarcate mining plots and are involved in the license application process, primarily by recommending license applicants to Chieftom Committees. Once the Chieftom approves the use of a plot for mining activities, the wardens prepare a mine plan for the Chief to sign. On the advice of the Committees, the Ministry of Mineral Resources then issues licenses. Mine Wardens also have the power to arrest and, through the office of the Attorney General and the Ministry of Justice, to help prosecute illicit miners and dealers.

¹ Additional Mine Manager Certificate Fee of 50,000 Leones for cooperatives and small companies (total manager certificate fee of 100,000 Leones)

² Additional Costs for Dredging – dredgers pay a \$500 dredging fee, plus an additional 100,000 rehabilitation fee (total rehabilitation fee 200,000 Leones)

LICENSE HOLDERS

Many license holders do not even have enough money to purchase a license and receive up-front funds from their supporters. Supporters are also needed for capital equipment costs and to compensate labor if they are paid any wage (some diggers receive a daily compensation wage in addition to or in lieu of a split of the production).

License holders are notionally in charge of the diamond plot, supervise the mining and pay the diggers. They sell to dealers who are normally businessmen or women in surrounding communities. In most cases the dealer is also the supporter. The license holder is in a vulnerable position for several reasons. Most have little knowledge of the value of rough diamonds. This system guarantees that there will be no serious competition and few situations where a license holder can sell diamonds to the highest bidder. It also encourages license holders to sell their diamonds secretly to unlicensed itinerant dealers who may be prepared to offer a higher price and who will likely smuggle the diamonds out of the country.

DIGGERS

Diggers normally work six days a week from 8:00 am until 5:00 pm, with a 30-minute lunch break. Sometimes they work through the night to strip overburden. By far the majority of the diggers are Sierra Leoneans, many of whom have migrated to the diamond fields from other parts of the country. Although life is tough and risky for diggers, there is no difficulty in attracting them because of the lack of other viable economic alternatives, and because diamonds in Sierra Leone – as elsewhere in the world – are commonly associated with the possibility of striking it rich. Digging diamonds is hard work and generally only a vocation for relatively young men. Many diggers see mining diamonds as a full-time job.

Typically, small-scale artisanal diggers search for the presence of corundum as an indication of the presence of diamond bearing gravels. Many of them are apparently not really clear on what they are actually looking for and only the washers seemed to be skilled at really distinguishing gems from quartz crystals that sometimes resemble the diamonds. Additionally, observers are stationed near the washing to prevent possible pilfering of stones.

Compensation of the diggers varies with most arrangements calling for the diggers to share in the receipts for the collected gems. Some receive daily allowances of 500 to 1,500 Leones (approximately \$0.17 to \$0.52) plus food (perhaps two cups of rice) that may or may not be deducted from their share of the receipts. Several dealer-sponsors spoken to suggest that it is common for the diggers to receive up to 7,000 Leones in wages in addition to their daily food ration. Most of the miners interviewed and anecdotal information available has suggested that the miners split one-third of the gross proceeds. One arrangement that apparently was historically used was to actually split the alluvium gravels into thirds before processing so that the split in revenues was actually dependent on how many stones were in the designated pile for the diggers, the license holder, and the sponsor. Again, it appears that actual arrangements vary as to how they were negotiated, but the diggers are the last to really understand how their share is determined and there are lots of opportunities to short people of this agreed share.

The actual number of diggers working in Sierra Leone is not known and estimates have ranged from approximately 60,000 to more than 200,000. Based upon the 2004 diamond export levels presented by the GGDO and assuming that the one-third gross split is given to the diggers, the diggers' compensation might be along the following order:

Table 8. Miner's Share

What the Miner's Share of the Diamond Trade in SL would be at 1/3 Gross Split

2004 Exports from Alluvial Mining	Miner Income at 1/3 share	Number of Miners	Annual Income of SL Miner (US Dollars)	Daily Income (assume 180 days)	
				Dollars	Leones
112,793,045	37,597,681.67	200,000	\$187.99	\$1.04	2,912
112,793,045	37,597,681.67	150,000	\$250.65	\$1.39	3,892
112,793,045	37,597,681.67	100,000	\$375.98	\$2.09	5,852
112,793,045	37,597,681.67	75,000	\$501.30	\$2.79	7,812
112,793,045	37,597,681.67	50,000	\$751.95	\$4.18	11,704
112,793,045	37,597,681.67	25,000	\$1,503.91	\$8.36	23,408

Exchange rate \$1 = 2,800 Leones

This table is likely a significant overestimate of the digger's compensation level, particularly since the calculation is based on export values that have factored in dealer and exporter shares. The benefit of this table is to illustrate that the estimate of 200,000 diggers in Sierra Leone is highly unlikely.

SUPPORTERS AND DEALERS

"Supporters" are the financial backers for most artisanal diamond mining. They are generally businessmen living in the diamond areas, and by far the majority are also dealers, or diamond buyers and sellers. For example, in Kenema District, Ministry officials report there are no supporters who are not also diamond dealers. Most often there are no legal agreements defining the conditions of a supporter's investment, however the license holder has an informal obligation to sell his diamonds to his supporter.

Miners and diggers are intensely dependent on financial supporters. In return, the supporters, generally closely tied to the domestic diamond-buying cartel, assume *de facto* control of a "supported" miner's mineral output. UNHCR has referred the miners as subject to "a system of debt bondage and a contemporary form of slavery." However, three ethnic Lebanese dealers spoken to in Kono saw themselves more as providing employment opportunities to the community and trying to provide a suitable life and future for their families, taking incredible risks from the very uncertain kind of mining that artisanal practices tend to be. None appeared to be enjoying extravagant success at what they were doing, all three indicated that they had been born in Sierra Leone and been raised within the diamond industry and saw no other options to support themselves.

Diamond dealers are the classic middlemen, and they are in a position where there is an opportunity to exploit those below in the mining chain. Dealers represent the first real expertise in valuation in the diamond chain, allowing them to set the prices for gems, while in turn demanding a reasonable market price from the exporter. As noted earlier, dealers who are also supporters influence or control the holders of mining license.

The majority of dealers are resident in the diamond cities of Bo, Kenema and Koidu. Dealers buy diamonds from license holders and sell to exporters. As of the date of this report, citizens of Sierra Leone pay \$1,900, ECOWAS citizens pay \$2,400 and other non-citizens pay \$4,000 for dealer licenses. There currently are about 135 diamond dealers licensed in the country, mostly foreign nationals. The term foreign nationals is a vague distinction in Sierra Leone, where there are thousands of second and third generation Lebanese families engaged in the diamond business, a large number of which now hold Sierra Leonean citizenship. For example in August 2003 in Kenema Town there were 66 dealers. Of this number six were what is called "indigenous citizens" with others from neighboring ECOWAS countries, especially Guinea, Senegal, Mali, and Ghana. A very large proportion of these dealers are of Lebanese extraction. Most own retail businesses and use those premises to conduct their diamond business. Dealers also have "agents" working for them to purchase diamonds at mine

sites on behalf of the dealers. The agents pay a license fee of \$800 and by law no dealer can have more than five agents working for him. With 135 dealers in operation, there could be as many as 675 agents in the field.

WOMEN AND CHILDREN IN MINING

During visits to mines, the only women and children observed were those who provided food for the miners. Women are known, however, to work in all aspects of diamond mining and the head of one of the Tongo Field women's groups said that she was a miner and suggested that included being a digger. A 2002 study on children in mining in the Kono District prepared by World Vision described how children are drawn into the mining sector. Some of the children initially went to the mining sites to help prepare food, but then stayed on to actually try their luck in mining. Three-quarters of the children interviewed during the study said they chose mining "to get money," many saying they had no alternative.

MINISTRY OF MINERAL RESOURCES

The Ministry of Mineral Resources (MMR) is responsible for all aspects of minerals management in Sierra Leone, including formulating policy, developing geological information, and administering regulatory requirements. MMR's mission statement is to "Develop policies and programs for the systematic and economic exploitation of mineral resources as well as formulate appropriate regulations for the mining industry and related activities to ensure that the nation derives maximum benefit from the mineral resources." A Minerals Advisory Board advises the Ministry on its statutory duties, particularly those related to the issuing of mineral rights.

MMR has two technical divisions, the Mines Division and the Geological Survey Division. The Mines Division is responsible for processing and issuing all exploration and licenses. This responsibility includes monitoring for compliance with license and lease requirements and supporting the enforcement of these requirements through revocation of such licenses or prosecution.

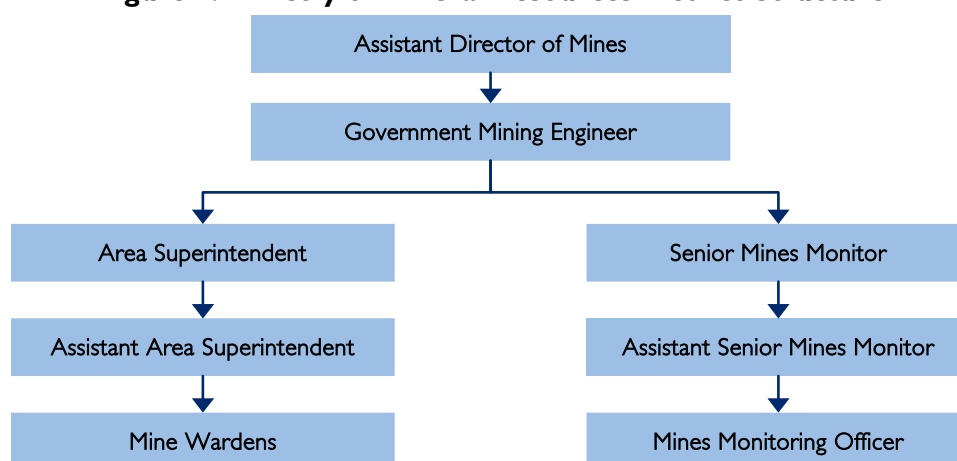
Because of a lack of funding, the Geological Survey Division, which is normally responsible for inventorying the mineral resources and preparing various publications to assist with the appropriate development and management of these resources, has not been able to maintain current information. The lack of such current information exacerbates the poor resource management practices that are currently characteristic of artisanal diamond mining. At the time of the preparation of the draft PRSP, the Geological Survey Division had 20 professional staff.

The Mines Division has largely decentralized its operations setting up Government Mining Engineer offices in Kono, Kenema, and Bo, the major mining districts of the country generally reporting to an assistant director headquartered in the field in Kenema. Figure 3 illustrates the basic management of the Division and the supervisory chain for the principal functional operations of the Ministry relating to artisanal mining, the activities of the Mine Wardens, and the Mine Monitoring Officers.

Within MMR there are 92 Mine Wardens that participate in the processing of the license applications by coordinating with the Chiefdoms and by demarcating the area for which an artisanal license is being sought. Mine Wardens also monitor for unlicensed and illegal mining. They are supposed to provide some level of technical assistance with respect to safe and appropriate mining activities.

The Mines Monitoring Officers are responsible for monitoring mining activities to ensure that they meet the requirements of any applicable license, checking that buying and selling of minerals is done in accordance with established procedures, maintaining records necessary to ensure that the Government is receiving the maximum benefit (i.e., royalties and taxes) it is entitled with regard to the sale of minerals, preparing reports to the Permanent Secretary of the Ministry of Mineral Resources on all relevant matters, and coordinating with the Sierra Leone Police, other security personnel and the public at large in order to ensure that smugglers are duly apprehended and brought to justice.

Figure 2. Ministry of Mineral Resources District Structure



Although MMR refers to 19 technical staff within MMR, it is a bit unclear if all or just some are MMOs.

Most of what Mine Wardens do is related to the artisanal sector while MMOs are more diverse in their responsibility. While at first glance there appears to be more than ample personnel involved with just 2,300 small operations, logistics is a major problem with getting these officials effectively mobilized in the field. One of MSI's early interventions was actually to provide a few motorcycles to assist with these logistics.

During the course of the Cemmats' August 2004 social survey in the Tongo Field area, various community members were asked about their impressions of the government mining officials. Although most indicated relatively high respect for the MMOs, this was not the case with Mine Wardens. The biggest complaint was about what they felt were undue delays in the procurement of licenses after demarcation of plots for mining.

Overall the Cemmats survey provided other community impressions of the MMR artisanal regulation scheme and identified the following areas of concern:

- Undue interference from traditional and influential people in the Chiefdom;
- Unlawful possession of diamonds;
- Competition with the Chiefdom Mining Committee;
- Role conflict and ambiguity of the Chiefdom Mining Committee;
- Lack of power (by Chiefdom Committees and Mine Wardens) to arrest; and
- Too many illegal miners and dealers.

CHIEFDOM AUTHORITIES AND LOCAL GOVERNMENT

Under the provisions of the Local Government Act of 2004, local councils were established as the highest political authority within a specific region having legislative and executive authorities and the responsibility for promoting both regional development and the welfare of the people in its jurisdiction. This includes mobilizing human and material resources needed for projects and social programs, managing activities related to the improvement and maintenance of basic infrastructure and services, undertaking community planning, overseeing Chiefdom Councils in the performance of functions delegated to them by the local councils, establishing rates of local taxes, and approving and supervising the implementation of annual budgets of the Chiefdom Councils within their jurisdiction.

The central Government of Sierra Leone is working to decentralize much of its current responsibilities by devolving a number of government functions to the local government units. Consequently, a number of local council committees have been established to correspond to the duties of the various Ministries of the Government of Sierra Leone (GOSL) to manage this transfer of responsibility.

Acting through their Mineral Resources Committees, local councils exercise their responsibility of managing community development funds given to Chiefdom Councils through the Diamond Area Community Development Fund (DACDF). The local councils are to provide oversight necessary to ensure proper implementation of DACDF-funded projects. The local council chairman or chief administrator must sign-off on any expenditure from the DACDF account. The Committee is supposed to work closely with the Chiefdom Councils in processing, approving and monitoring the implementation of the projects. Based on information provided the team, MMR is planning to revisit the guidelines regarding management of the fund activities including specifying accounting and reporting systems used by grantee's chiefdoms and establishing a monitoring unit to verify that project implementation is conforming with these requirements.

Another function of the local councils acting through their Mineral Resource Committees is the coordination of mining licenses. The committees plan set up separate monitoring officers to periodically make field visits to mining areas to check licenses, report illicit mining, and develop a database for mining activities in their locality.

Rehabilitation of mined-out areas is the third function that is being devolved by the MMR to the local councils. The Committee facilitates reclamation by sponsoring a detailed assessment of mined-out areas, prioritizing sites for rehabilitation, managing the bidding process, awarding of contracts and monitoring for successful implementation of the contract. This function is to be carried out in conjunction with the Procurement Unit of the Council and the Technical Committee, which is comprised of the Government Mines Office, Committees of Agriculture, Lands and the Environment, Chiefdom Councils, and Chiefdom Mining Committees.

For all of these devolved functions, there is supposed to be corresponding transfers of monies by MMR to the local councils to meet administrative and other costs. Additionally, Local Councils are also supposed to receive a share of the mining revenues. This share, as determined by the Ministry of Local Government in consultation with both MMR and the Ministry of Finance, has been set at 20% of the DACDF.

For the Kenema District, the government recently transferred 70 million Leones to the Council from these various sources.

Sharing of the DACDF is intended to be a strong incentive for local councils' involvement in regulating the mining sector. Whether this could be seen as a welcome idea to other stakeholders in the sector such as the Chiefdom Councils, Chiefdom Mining Committees, the Mines Wardens and Mines Monitors, who may see this new entrant as a threat to their power or an encroachment on their jurisdiction is yet to be proved. Already there are a few instances of clashes between some Chiefdom Committees and local councils regarding certain functions, especially setting of tax rates, revenue collection and payment of precepts to local councils.

Clear understanding of the roles and responsibilities of the local councils, Chiefdom Councils, and other interested stakeholders in the mining sector needs additional work. Factors such as ready access to the DACDF reclamation accounts, the technical capacity to undertake effective land reclamation and promote environmentally sound mining practices, access to adequate and timely information on artisanal licenses are all key elements to the effective performance of these devolved functions.

OTHER POTENTIALLY INVOLVED ORGANIZATIONS

The overall responsibility for Environmental Protection for Sierra Leone is vested with the Environmental Division of the Ministry of Agriculture, Natural Resources, and Fisheries. This is a small, underutilized organization that seems generally focused on the country's participation in international conventions and implementing its main authority, the Environmental Protection Act of 2000. The Act is poorly written legislation requiring that certain 'projects' must obtain licenses from the Division of Environment before they

are undertaken. For the most part, the intent of the language appears to require screening of investment proposals for potential environmental impacts and providing the Director of Environment the discretion to require the submission of a full Environmental Impact Assessment (EIA) before the project is undertaken.

The Act does not appear to address the specific release of pollutants into the environment nor any environmental management responsibilities by any person beyond those that might be contained in an approved EIA. The Division indicated that it totally deferred the management of artisanal mining activities as outside its jurisdiction and the exclusive responsibility of MMR. However, the Division seemed somewhat interested in attempting to assert its authority over the preparation of any type of environmental assessment conducted within the country, including this PEA. Hopefully, the team was able to clarify that this activity appears to be generally outside the scope of the Environmental Protection Act, although we indicated that the activities of any specific mining operation that might be supported by USAID programming could fall within the Department's jurisdiction, particularly since MMR appears not to be well focused on environmental protection matters.

The interests, authorities, and jurisdiction of the Ministry of Agriculture, Forestry and Food Security were not adequately assessed during this study to determine how this agency might play a role with the artisanal mining sector. This is also generally true of the Ministry of Health that is notionally responsible for the quality of potable drinking water and sanitation within the country. Although we were unable to make suitable contacts to confirm their involvement, all indications are that they also defer to MMR regarding any of these issues as they apply to artisanal mining. Because the continuation of artisanal mining is largely for socio-economic interest, it would also be advisable to involve the Ministry of Social Security in future sector decision-making.

Except for the Movement of Concern of Kono Youth (MOCKY), there are just a few civil society groups that are specifically interested in artisanal mining issues. MOCKY believes that the industry is full of inequities and that opportunities outside the sector should be examined in addition to trying to normalize it. The United Mineworkers Union is trying to organize diggers in a grassroots effort to raise its membership with some expectation of being able to help them negotiate better overall benefits.

THE THREE SCENARIOS OF ARTISANAL MINING IN SIERRA LEONE

There are three distinct scenarios of artisanal mining activities in the Country:

1. Mining in virgin (previously un-mined) areas without prior rights being issued.
2. Mining in virgin areas where prior rights have been issued in the form of exploration permits or mining lease.
3. Mining in previously mined areas where major geological disturbances have already occurred.

VIRGIN AREAS WITHOUT PRIOR RIGHTS

In the first case, the classic approach to mining would be to require that some exploration be conducted prior to allowing actual extraction of any minerals from the alluvial deposits. Based on the results of the exploration and appropriate assays, the Chiefdom and the Ministry of Mineral Resources would then be in a position to determine how productive the area would be and if the return on investment in mining activities would be warranted. The investment could then unquestionably include the full responsibility for remediating the site and returning the land back to another beneficial use after the mining activity was concluded.

With a reasonable characterization of the mining plot, the authorities could much more easily demand and enforce methodical mining methods that would more efficiently extract the diamondiferous alluvium and better understand the character of the materials that would be returned as part of the remediation program.

The Ministry of Mineral Resources referred to such methodical practices as the Ghana method where there is continuous excavation and continuous backfilling until the plot has been entirely worked.

Unfortunately, neither the Chiefdom nor the Ministry follows this classic approach. Rather, the ensuing rush of miners to a virgin area thought to be diamondiferous is greeted with the opportunity to issue permits and take receipt of the land rents and license fees associated with the activity. The current license procedures followed by the Ministry never allow for any checks and balances to prevent uncontrolled exploitation of this scenario.

VIRGIN AREAS WITH PRIOR RIGHTS OF EXPLORATION

The second scenario apparently is a quite serious breach of the current law whereby the Chiefdom and the Ministry of Minerals Resources allow mining activities to be conducted on lands with prior mineral rights having already been granted. In some cases, the MMR issued the exploration licenses in areas long before the expiration of effective artisanal licenses in the exploration lease area. However, in most cases, this involved the licensing of artisanal mining in areas exclusively for exploration purposes or, in one case, for actual exploitation of the same minerals. The exploration rights, in most cases, were given to larger companies that plan to extract diamondiferous ore, but are likely to also include exploitation of alluvial deposits if so discovered. The issuance of the exploration license implies that the company is conducting appropriate assays needed to define and develop their mining program.

By allowing artisanal miners access to these areas, the government authorities have compromised their own authority as well as potentially impacting the investment strategy of the exploration license holders. Chiefdoms may argue that they have not been privy to the issuance of the exploration license and therefore were not in a position to advise the prospective miners that their license could never be issued. However, the procedures to ensure the Chiefdoms are appropriately advised of the status of mineral rights seem like a very minor undertaking.

There is no reason other than a desire to collect license fees why the Ministry of Mineral Resources might issue an artisanal mining license for an area under an existing exploration license. Some of the people interviewed stated that the artisanal miners had already been operating at a site prior to the exploration license being issued. While this is possible, licenses are for a fixed term and would expire or be subject to renewal negating this argument over time.

RE-MINING OF AREAS

The third scenario of reworking old mining areas is apparently the most common of the artisanal operations. In this case, it would be almost impossible to conduct an assay of the alluvial formations to determine their content of diamondiferous materials. Topsoil, overburden and alluvium have all been mixed and the area's geologic integrity can no longer be well characterized. Rather, these areas rely on the inefficiency of the prior mining processes leaving many gem quality stones in place. Recovery is essentially a matter of luck rather than of methodical, reasoned mining programs.

The re-mining of these sites provides an opportunity to recover the land if the re-mining were conducted in a responsible way and if the authorities were much more serious about their responsibilities to protect the natural and mineral resource wealth of the country. First, the authorities should prioritize the old mining areas to determine if any represent a particular threat to infrastructure, health, or the environment. If so, the area should be given a restricted status where no new licenses are issued. If there appears to be reasonable potential for mineral recovery in any of these restricted areas, exceptional precautions need to be included before any authorization is granted for mining to continue. These areas should also be designated as high priorities for the Sierra Leone national mining restitution fund and incentives provided to the community to convert these abandoned mining areas back to beneficial uses.

For areas that do not pose any particular threat but are still potentially of concern because of land use impacts, environmental integrity, and aesthetic value, re-mining authorizations ought to include a specific

responsibility to apply a methodical program that, to the greatest extent practicable, includes continuous excavation and backfilling.

Box C. Rehabilitation of Kaisambo: A Case Study

Within the town of Koidu much destruction has taken place, as houses were undermined in the continuous search for diamonds, particularly during the recent period when law and order were nonexistent. The town was left with a disjointed landscape, deep pools of standing water close to areas of high population density. The pools have become breeding grounds for mosquitoes, but more importantly dangerous playgrounds for local children who are known to bathe at these sites. One such site, the Kaisambo, is located in the heart of the town and became both a social and environmental concern for local and national government officials.

Although mining at Kaisambo was stopped during the 1980s, activities resumed in the early 1990s and were continued by the RUF during the civil conflict until 2002.

After the war, over 30 small-scale licenses were issued for Kaisambo. Civil society groups actively worked to stop mining at the site and were frustrated by the inaction of the Chiefdom authorities and the government officials. After extensive politicizing of the issue, the President of Sierra Leone ordered the cessation of all mining and invalidated all existing licenses at the site.

At public meetings held in March 2004, the community and later the Minister of Mineral Resources agreed to a program for reclamation of the Kaisambo area.

A local agriculture NGO, Forest Resource Promoters, prepared a proposal for reclamation of about 6 acres around Kaisambo.

The proposal was submitted to the MMR who in early May announced that the rehabilitation of Kaisambo was open to tender. The rehabilitation of Kaisambo is still in progress.

ARTISANAL MINING RECLAMATION FUND

The MMR is currently responsible for managing the Artisanal Mining Reclamation fund into which 100,000 Leones from license fees has been accumulated. At 100,000 Leones (\$35.70) per acre per license and most plots being only about an acre, the reclamation fund generates approximately 230,000,000 Leones or approximately \$82,000 per year. On February 1, 2005, the contribution to the reclamation fund from an increased fee was raised to 200,000 Leones, about \$164,000 per year at the 2004 license issuance level. We understand that some additional funds might also be directed to this fund from new charges to dealers and exporters, the total amount of money is unlikely to be much more than \$200,000 per year at the current licensing rates.

While the law lacks explicit language as to the artisanal license holder's responsibility to reclaim mining lands, the application form requires the inclusion of a reclamation plan and the renewal requirements make the failure to undertake an adequate reclamation program a basis for denial of license renewal. Small-scale licenses are explicit as to the responsibility for reclamation and do not contain any requirement to pay into the national fund. From this basis, artisanal license holders are generally convinced that they have already covered the reclamation responsibilities and transferred the duty for environmental protection back to the state. Whether by policy or by just acquiescence, the MMR has taken no action with respect to license holders reclaiming the lands.

Although the Ministry has accumulated monies for reclamation from the license fees over the past few years, they have attempted to utilize these funds for only one reclamation project, Kaisambo, an area of approximately 3-5 acres in size. A description of this case study is included in Box D.

The Kaisambo reclamation tender issued by the Ministry was fairly non-specific as to the extent of the work to be done or the criteria to be used to establish a reclamation plan for the bidders to base their estimates. The contract award that was made was for 133,000,000 Leones, approximately \$47,500, or between \$9,000 and \$16,000 per acre.

Unfortunately, it is unlikely the Kaisambo will provide very good information about what might be the actual anticipated costs of reclaiming an average acre of ground and returning it to beneficial use since no specifications regarding the reclamation were contained in the tender and the contractor is already concerned that he has insufficient funds. The contractor has suspended his work on the site for now, but still has several months left in the contract to complete work.

The range of \$9,000 to \$16,000 per acre seemed quite high to the team and we would anticipate that the costs could be much less than this, but still at least 1, 2 or more orders of magnitude over the reclamation fee collected by the state. At \$9,000 per acre, only about 18 acres could be completed with the annual proceeds (post February 2005) from the fund. Contrast this with over 2,300 acres mined annually.

As a very rough estimate, the team would anticipate that continuous backfill might add about 20-40% to the current costs of gravel excavation at a mining site.

The whole idea of the reclamation fund has been to shift the responsibility of reclamation, and to some extent, sound environmental mining, back onto the shoulders of the government. This is generally inconsistent with the trend of the 'polluter pay principle' that is being advocated worldwide and is explicitly articulated in the Environmental Protection Code of Sierra Leone.

The team believes that the idea of a reclamation fund is very good if it properly undertaken to address those mining areas for which no 'responsible party' can be held accountable for the proper mining management, including backfilling, or an exploited resource. If a responsible party can be identified, that party should pay all relevant costs associated with clean-up of the mess created by the mining activity. The team further believes that the government should not assume more financial responsibility or risk as a way of subsidizing mining activities. This increases rather than reduces the social and economic perversions already plaguing the industry and the artisanal sector.

Consequently, successfully implemented reclamation funds should be directed to the clean-up of sites where the opportunity to exploit materials has clearly been exhausted and the site will be taken out of consideration for further mining. The fund might also be used to enhance reclamation activities at sites where re-mining with appropriate continuous backfill and contouring will not bring the site fully back for other beneficial uses (e.g., bring in major quantities of top soil, enhance the drainage network within a series of plots, plant trees, etc.).

DIAMOND AREA COMMUNITY DEVELOPMENT FUND

The government has started to address community concerns regarding how the monies it receives from diamond exports are used. In December 2000, it created a Community Development Fund to return some of the revenues from legal exports to the mining communities. One quarter of the 3% export tax on diamonds is distributed every six months to the various Chiefdoms that have licensed mining activities within their boundaries. The amount that each Chiefdom receives is proportional to the number of licenses issued by each community. This fund is intended to encourage community monitoring of mines by creating a monetary incentive; encourage paramount chiefs to issue licenses rather than allow illicit mining; and return mineral extraction revenues for development projects. After a rocky start, changes to the distribution scheme have greatly improved the program. However, a recent study by Talking Drum Studio, an international NGO, revealed that many community members are unhappy with how the fund is managed locally and how the decision making process is not open to public review and transparent.

Several international NGOs were interested in a National Commission on Extractives to provide oversight to the Community Development Fund, but their participation with the program waned after they were unable to receive funding to help support their interest. MSI's Diamond Alliance Program supported an early grant to the indigenous NGO Talking drums and CRS to monitor the Fund activities and provide training for the first three rounds of funding awards. The fund is currently in its eighth cycle of funding projects.

Responding to criticism that many of the Chiefdoms had squandered the funds on inappropriate projects, the Ministry of Mineral Resources now classifies Chiefdoms to recognize their demonstrated capabilities to undertake successful, quality projects. The classifications are as follows:

- Class A Chiefdom has demonstrated ability to undertake quality projects.
- Class B Chiefdom quality of projects is suspect and the chiefdom is currently suspended from project consideration.
- Class C Chiefdom does not have enough resources to undertake projects at this time.

How a Chiefdom regains Class A status was not fully clarified. Nor is it clear what happens to the funds that would have been allocated to that particular Chiefdom, i.e., if it is redistributed to other Class A Chiefdoms or held in suspension until the Chiefdom can demonstrate its capability for quality projects.

SPECIFIC ENVIRONMENTAL CONCERNS ABOUT ARTISANAL MINING

UNSAFE MINING CONDITIONS

The occupational hazard of artisanal diamond mining is much less than that of other activities in the mining sector. For the most part, the diggers are not exposed to chemical hazards and have few mechanical hazards to contend with. However, there is a significant risk to the diggers from unstable slopes and excavations leading to landslides, subsidence of overlying formations, and possible entrapment in excavation pits. All the major accidents involving fatalities were attributed to illegal mining operations, the bulk of these the result of subsurface tunneling of alluvial deposits to avoid the authorities identifying the illegal operations. Of the six deaths recalled by the authorities, five were from cave-ins and one was from asphyxiation because of inadequate airflow in the confined space in which the miner was digging.

Excavation procedures should be developed to insure that maximum side-slope angles do not exceed the angle of repose and that benching techniques are applied to improve embankment stability. Care must be used to avoid coming into contact with infrastructure and particularly with respect to maintaining the structural integrity of any infrastructure near to the mining areas.

Since artisanal mining is often conducted in old alluvial channels or during the dry season in areas that would otherwise be flooded at wetter times during the year, care must be taken with regard to water management practices and the exposure to water born vectors which might exist. Cross contamination from failure to properly site areas for waste disposal or human waste is a common issue that warrants better planning and execution at most mining areas.

At some locations, mechanical separators are used to grade the alluvium before washing and there is always a need for care that operators of the machines keep free from moving parts to minimize any chance of injury. Specific training on how to properly operate machines is prudent and it is essential to always have someone nearby to shut down the machinery if any problem does arise.

More significantly, when heavy equipment is being used, diggers should evacuate any area adjacent to the equipment working area, recognizing that the field of vision of any equipment operator is extremely limited and, on occasion, the equipment can add to the instability of the trench areas.

Old mining areas can be dangerous both during the mining activities because of uneven land surface and hidden depressions in the ground. Either vegetation or other over cover (large stones, brush and dirt) may give the misimpression that the ground is stable. This is a major cause of accidents of abandoned mine sites around the world with many sprains or broken bones or worse if someone were to fall in the depression (or old mine shaft).

HEALTH CONCERNS AT THE MINE SITE

There are at least 300 million acute cases of malaria each year and more than a million deaths, 90% of which occur in Africa. Malaria is Africa's leading cause of mortality under 5-years-old (20%) and constitutes 10% of the continent's overall disease burden. On the continent, it accounts for 40% of public health expenditure, 30-50% of inpatient admissions, and up to 50% of outpatient visits in areas with high malaria transmission. Anecdotal information obtained during the study indicated that more than 85% of all Sierra Leoneans have been infected and live day-to-day with the problem. Consequently, one of the biggest health concerns from supporting the artisanal mining sector is what might be the effect of any action on the transmission of the disease or frequency of acute malaria episodes.

Overall, it is impossible to put much quantification or qualification on the specific impact of having old surface impoundments from mining, particularly since rice paddies are even more ideal habitat for malarial carrying mosquitoes. Consequently, disease management has normally been undertaken by medical professionals rather than by environmental experts looking to reduce the habitat of biting mosquitoes. However, there are some considerations that can be made to, at least, reduce exposure in areas where people congregate. One such possibility with respect to mining would be for licensing criteria to provide a buffer of at least one or two kilometers between any mining plot and a residential area, since mosquitoes do not tend to range very far from their breeding habitats.

Contouring the land and establishing improved drainage of abandoned mining areas are also important elements of reducing potential mosquito habitat. Expanding the irrigated area so that there is less shoreline relative to irrigation has also been proven to reduce the total number of vectors in rice paddy areas.

Perhaps more important to malaria control at the mine site is to educate people so as to limit the vectors in their direct vicinity. Covering standing water in cans, cups, and rain barrels around houses helps to limit mosquito habitat and a significant portion of the risk of getting bitten.

An Integrated Vector Management (IVM) approach to malaria control includes both environmental management and more traditional vector control approaches using chemicals. Environmental management is about good housekeeping of the environment, ensuring that opportunities for vectors to exploit are reduced to a minimum.

WHO cites a very old case example of the effectiveness of environmental management in the control of malaria in the copper mines of Zambia. Vegetation and water management controls led to a reduction of malaria deaths and clinical episodes by 70-95% in the region. Unfortunately, this approach was not often replicated and environmental controls are not given much attention against traditional medical responses.

Annex 12 describes environmental controls that have been successfully used to reduce malaria exposure and incidence. These examples may help identify additional opportunities to better manage infrastructure and land use for better malarial control.

Most of the other health issues at the mine site are directly related to the effect of so many people congregating in such a small area. The stagnate nature of water in which they may be working could pose some additional exposure concerns beyond malaria, including but not limited to schistosomiasis. Poor living conditions to which the diggers are subjected make them much more susceptible to many other diseases. However, none of these issues are dramatically different than what many other communities face on a day-to-day basis.

The mining areas of Sierra Leone are particularly limited in health facilities and outposts. According to available statistics, Kono district has about half average public health capacity of other districts in the rest of the country. In 2003, the official statistic was only one doctor per 179,000 persons. The situation is much better in Kenema, but there is a great distance to be traveled to that center.

The primary health care center in Tongo indicated that virtually every miner that had come into the clinic complaining of diarrheal problems was diagnosed as having schistosomiasis. Additionally, the clinic said that they believe that other types of water-born diseases are on the rise. Typhoid cases have increased dramatically over the recent past.

Regarding the treatment of accidents, the clinic said that most of the incoming cases from mining sites were from fights between diggers in the field. The director speculated that this might be directly related to the finding of stones and everyone wanting to make certain that they got a share of the booty.

ENVIRONMENTAL IMPACTS OF SMALL-SCALE MINERS

Among the chief environmental concerns of small-scale mining is that it takes lands out of otherwise productive use. A 1994 study by the Environmental Foundation for Sierra Leone of small-scale gold and diamond mining in Kambia district provides an example of this phenomenon. Because of the conflict, 5,000 displaced miners from Kono went to Kambia. Within weeks of their arrival, they began prospecting for gold and diamonds in Kambia's agricultural swamps. By October 1994, an estimated 10,000 acres of inland valley rice swamps spanning the length of the district had been degraded and made unsuitable for agriculture. In the process, the displaced miners attracted a following of local youth and entrepreneurs who believed, "One good-sized stone will solve all my problems." In reality, the swamps did not hold the quality and size of gems found in Kono.

If a stone is found, within a short time an area can be swarming with diggers hoping to be 'lucky.' Skill and science play an extremely small role in the decision to tear up the lands in search of their riches. Sometimes, the government has come in after the fact to issue licenses merely to gain some revenues from the rush without regard to whether the area holds promise for mineral recovery. The environment is severely compromised to the detriment of the rest of the people of Sierra Leone who ultimately will have to pay the social and economic costs of this uncontrolled situation.

The environmental impact of operating small-scale artisanal mining is somewhat limited by the lack of equipment on site to move massive amounts of materials within a short time period. While mechanized programs provide the opportunity to utilize some traditional environmental controls, the increased volume demands these extra precautions be taken immediately upon start-up.

Unlike more mechanized methods where significant water diversions are possible, artisanal miners are generally limited in their ability to excavate in wet areas, relying only on pumps to dewater a site. Mechanized operations would construct major diversions of any water channel or otherwise barrier the area to provide dry working areas for excavation. The construction of these diversions requires knowledge of the downstream channel situation including population patterns and habitat and the consideration of potential impacts before any diversion is undertaken. The location of pumped water discharges also requires consideration of these factors, but to a much lesser degree.

General concerns from artisanal diamond extraction include:

- Siltation of dams and rivers by loosened sand and gravel from mining sites occurs.
- Indiscriminate deforestation takes place as miners chop down trees for fuel and shelter or to clear an area for excavation.
- Squatter problems occur as 'overnight' haphazard settlements spring up.
- Lack of proper sanitary facilities lead to health risks.
- Social impacts from crowding can contribute to crime, drug trafficking and prostitution.
- Ground and surface water pollution are created from mineral processing effluent and raw sewage.

- Acid mine drainage is present, also from rock and slimes dumps if the excavation is in highly mineralized zones (typically not the case for diamonds).
- Dust pollution happens from blasting, earth moving equipment, and from waste rock and slimes dumps.
- Loss of the land's aesthetic value occurs through random pitting and subsidence.
- Water table depression takes place as a result of pumping water through shafts, and in some cases through boreholes.
- Heavy metal pollution is created (for example copper, lead, arsenic, mercury, or cyanide can be a problem in heavy mineralized areas, typically not a concern for diamonds but a huge concern for precious metals mining like gold, even at an artisanal level).
- Oil pollution can result (oil leaks from vehicles and machinery).

SIERRA LEONE EXPERIENCE WITH ENVIRONMENTAL REMEDIATION

There are three case studies regarding the reclamation of mined out artisanal lands in Sierra Leone. One is the Kiasambo site in Koidu Town in the Kono District that the Government is currently undertaking. Unfortunately, early signs are not promising that this site will be appropriately remediated or that it will provide any quality model for future reclamation projects. Box D above has already presented this case study.

Women's groups in the Tongo area undertook both the other two examples of actual reclamation projects. The Muloma Women's group was formed because of ongoing food security issues and the members desire to become more involved in agriculture. The group petitioned the town chief to provide them with a parcel of land that they would be guaranteed access to without concern that it would revert back to mining. The group entered into a signed agreement with the Chiefdom that they believe provides such protection.

Under a post-war project to promote subsistence agriculture operated by World Vision, the women's group was provided with a few tools for gardening, shovels, hoes, picks, etc. In order to raise capital to hire laborers to actually backfill the old mining area, each of the 22 members of the group agreed to pay 1,000 Leones each week until they raised sufficient funds. Later, the amount was increased to 1,500 Leones.

The group advised the assessment team that they raised over 700,000 Leones that proved enough to reclaim about 3 acres of swamplands for rice cultivation. This money covered the labor of 15-18 workers over the month of August 2003 at an average daily rate of 3,500 Leones.

The swamplands in this case overlaid a weathered kimberlite dike once excavated by the SLST and its successor company, the NDMC, who took some care in stripping off the topsoil and isolating it from waste rock. The group was able to mix some humic material to enrich the soil cap. However, it wasn't till the second planting of rice that the crop yield was considered normal.

The group said that the amount of rice they produced was only sufficient to feed each of the 28 participating families for only about a month. We were unable to establish to what extent this offset their previous purchase of 50 kg bags of rice at the market for 64,500 Leones.

One additional point is worth noting, the kimberlite dyke area in which this reclamation project took place is part of Koidu Holdings' exploration lease. Consequently, there is indeed a possibility that this land could again be subject to mining, but not using artisanal methods.

The women's group 'Sinava' undertook the other example of reclamation. Sinava means 'for the future.' Similarly, the reclamation was performed with tools received from World Vision and with paid laborers who

earned 5,000 Leones a day plus food for their effort. This women's group was a little more creative in its raising of capital for its project by using proceeds from Gara tie-dying and soap making to invest in the reclamation. Proceeds from the crop production were also reinvested in the reclamation activity. Despite their satisfaction with the project, the production actually falls far short of addressing the group member's own demand for rice as a food commodity. However, they are determined to continue to expand their farming activity to additional reclaimed lands.

PROJECT AND ALTERNATIVE ASSESSMENT

Under the Special Objective, artisanal mining is presented as a critical industry within Sierra Leone, particularly referencing the attention the sector is receiving from the government and in planning strategies such as the Poverty Reduction Strategy Paper. What is implied from all this attention is that artisanal mining is a growth industry that may be able to absorb more people to effectively participate in its potential returns. Unfortunately, these depictions of the sector fail to adequately qualify this impression and there is much compelling information to suggest that its opposite is true. Artisanal mining in Sierra Leone appears to have a diminishing potential to sustain its historical production levels and it may be largely because of avoided costs that the sector is currently profitable at all.

In the absence of good and current mineral characterizations, no commercial organization would invest in efficient and environmentally sound mining approaches. To be commercially viable, a source would have to be rich enough to provide adequate productivity to cover the overhead needed to mobilize systems to ensure such efficiency in management and environmental practice. Artisanal mining is not efficient from a productive standpoint and has been historically destructive throughout various parts of the world. The avoided costs by not remediating damage done or minimizing damage from these practices are ultimately born by the rest of society or future generations. To hold the artisanal mining sector to the appropriate higher standard of performance that it should be held accountable (i.e., requiring reclamation of the lands that they tore apart) should actually diminish interest in using artisanal mining methods.

The argument for supporting artisanal mining activity is wholly vested in its value as a social program, perhaps as a bridge livelihood until some more appropriate vocation becomes available. In Sierra Leone, artisanal mining activities have been artificially subsidized without full recognition of that fact or its longer-term consequences.

Without asserting its authority to minimize and/or manage the scavenging of the lands, the government is complicit in the destruction of the mining area lands. Contemporary mining is generally constrained by governments to ensure that such management practices are uniformly applied. Because of the legacy of mining companies disappearing once a commercial operation becomes unviable, upfront financial assurances (see Annex 11) are almost always required to cover the costs burden otherwise imposed on the state. The artisanal reclamation fund that is accumulated by Sierra Leone might be considered as partial financial assurance, but only if the fund is accessed to clean-up sites where the former operator's financial capability is fully exhausted.

Assistance to the government (including other organizations that are duly recognized as responsible for specific aspects of mining or mineral management) that ensures the application of sound mining management should be an appropriate intervention. However, any intervention that is based on encouraging artisanal mining to continue or expand may merely be driving further in the wrong direction. Investments to provide people an acceptable exit strategy from the artisanal mining sector toward more sustainable livelihoods appears to make a much more sound approach.

PROPOSED ACTIVITY FOR WHICH THE PROGRAMMATIC EVALUATION WAS COMMISSIONED

Providing the miners with access to working capital has been identified as a prerequisite to any “unbundling” of the present arrangements. It is assumed that this would allow the miners and the diggers to receive a more

competitive price for their efforts and dissuade them from engaging in illegal or illicit practices, notably the smuggling of stones.

Although the Agency is contemplating the establishment of a finance facility or mechanism to provide such credit to the artisanal mining sector, the anticipated scope of the program and the activities anticipated for possible funding were not fully identified. However, eligibility for credits would definitely be tied to a binding commitment to abide by the ‘*code of conduct*’ that has been established by the Peace Diamond Alliance and to a commitment that the general target of any credit scheme would be mining cooperatives formed through the Alliance.

The Alliance is in the process of preparing a pilot program to help define many of the specific aspects of the credit scheme and has already conducted a mini-competition within its cooperative members as to how they might apply such credits. As an illustrative example of how such credits might be applied, one cooperative’s proposal viewed in the MSI offices suggested the following:

Table 9. Illustrative Credit Activity of a PDA Cooperative

Project Element	Cost Per Unit (USD)	Unit	Anticipated Cost (USD)
Cost of acquiring license	\$200	1	\$200
Land clearance, use of bulldozer for 8 hours	\$500	1	\$500
Stripping	\$1,000 per acre	5	\$5,000
Extraction			
Water pumps			\$8,000
Miscellaneous			\$1,000
Total Projected Need			\$15,000

The illustrative project did not contain any information about how the mining process would be undertaken, any specifics about the plots proposed for the work, or any information about undertaking any closure and reclamation activities once the project was completed.

It was not clear from the project description supplied what activities were considered in the stripping line item, particularly regarding wages and expenses for the diggers.

Assuming that the diggers were paid a wage in accordance with the terms of the ‘code of conduct,’ as well as receive a meal subsistence allowance as is generally provided to the diggers, Table 10 would represent the cost component of a 180-day mining cycle related to the diggers.

Table 10. Support to the Diggers

Wage Rate (daily)	Price Per Day (USD)	Days	Diggers	Subsistence 500/day	Totals (USD)
500 Leones	\$0.18	180	50	\$1,620	\$3,240
1,000	0.36	180	50	1,620	\$4,860
2,000	0.72	180	50	1,620	\$6,480
3,000	1.08	180	50	1,620	\$11,340
4,000	1.42	180	50	1,620	\$14,580
5,000	1.77	180	50	1,620	\$17,820
6,000	2.13	180	50	1,620	\$21,060
7,000	2.48	180	50	1,620	\$24,300

Still remaining to be factored into the equation are the environmental management costs and reclamation costs. Since traditionally little regard has been given to segregation of topsoil and overburden from the waste alluvial gravels, the license holder would incur higher excavation processes if it followed even a modestly environmentally friendly procedure. Added to those costs is the need to backfill the excavations, contour the land, and take steps to ensure that appropriate drainage will continue after closure. Contouring the land may require the use of heavy equipment for compacting soils and appropriate sloping of the terrain. If the lands are reworked mining areas, appropriate reclamation may require importation of topsoil or nutrient-bearing materials. However, in the case of these reworked areas, it might be argued that only backfilling, compaction and contouring represent adequate land salvage for purpose of the license.

These costs need to be contrasted against average total revenue of \$49,040 per license that includes the dealer's and exporter's shares (see Table 5). For purposes of this analysis, assume that the exporter and dealer represent a total of 25% of the export value of the stones and that the remaining money, \$36,780, is available to cover the mining expenses. After repayment of the loan principal, \$21,780 would be available to cover digger's wages, loan servicing, avoided reclamation costs, and any increased management costs arising from other conditionalities.

As a very rough estimate, the team would anticipate that continuous backfill to ensure appropriate reclamation might add about 20-40% to the current costs of gravel excavation at a mining site. Verification of the cost of loan servicing is needed, but our preliminary survey has yielded an annual percentage rate of between 30 and 60%. At such rates, a six-month loan of 10,000 would require payback of between \$11,500 and \$13,000, or loan servicing fees of between \$ 1,500 and \$ 3,000.

Making analysis of the proposed project a little more difficult is the lack of clarity of exactly how the cooperatives are to be formed as creditworthy operations. At this point, we are not using this term in its classical sense, but rather as a group with a common business interest. Several of the cooperatives were described more like associations focused on the full range of artisanal mining issues rather than any specific business transaction. Regulatory and community interests are different from business interests and although they can often be brought into accord, they are also often from diametrically opposite perspectives. The primary values of a community include the health and welfare of its resources and people. The Government's duty as a policy setting organization is to ensure economically and socially responsible behavior and overall welfare of the people and resources it represents. Primary business values focus on return on investment and being competitive, something made a bit more difficult if social responsibility is met at a high level.

If the cost of complying with the credit scheme is deemed too high, utilization of the program will be limited. The avoidance of legitimate costs of appropriate mining practices is a major factor why many artisanal mining operations continue to be undertaken. If actions are taken to remove the institutional perversions of the current system, it is possible that the credit scheme could have some effect on breaking the current cartel, but the extent of this effect is difficult to establish.

Box D. The Peace Diamond Alliance Code of Conduct

This code of conduct has been created and approved by the PDA Executives on 30th September 2004 and confirmed by the full membership.

The essence of the code of conduct can be encapsulated in the following statement:

All Alliance members shall conduct themselves in a manner that is beneficial to all other members of the Alliance and the targeted community or communities.

Specifically this entails the following:

Overall Objectives of the Code of Conduct

1. All members must give their allegiance to the objectives of the Alliance.
2. All members must be legally compliant with all fiscal and mining legislation of the Republic of Sierra Leone.
3. All members must ensure that all diamond proceeds are utilized for peace and development.
4. All members must report to the Alliance in a timely manner any activity that is inimical to the interest of the diamond mining industry at large.
5. All Alliance members must perform the duty that is required of them particularly in the area of capacity building to enhance the sustainability of the program.
6. Alliance members must ensure that their workers receive a fair and decent living wage commensurate with their services.
7. All members and their associates must behave in a transparent manner.
8. Workers in PDA-related mining activities, opting for winnings share must be informed of the percentage of winnings in advance and will be paid according to sale receipts.
9. A worker or his representative must be present at the time of sale of winnings.

Transparency and Accountability

1. All funds received on behalf of the Alliance must be judiciously spent and accounted for in a transparent manner and reported to the satisfaction of all stakeholders.
2. All Alliance business, including management of the proposed credit scheme, recruitment of Alliance staff and the overall management of the Alliance project must be conducted transparently.
3. The books of expenses for any Alliance member's mining operation shall be kept in triplicate and all parties, including diggers, shall be privy to the contents.
4. All Alliance members are to serve as watchdogs of beneficiaries of any assistance, financial or otherwise, to prevent fraudulent activity.

Alliance Information

1. Information meant for the public shall be channeled through the designated official at the respective branch office of the PDA.

The Alliance and the environment

1. All members of the Alliance must be required to mine in an environmentally safe manner.
2. All members commit to fill alluvial work sites at the end of mining and to assist community members to return the area to agricultural use.

Alliance Member Behavior

1. All members of the Alliance must not use child labor.
2. All members must show respect for colleagues.
3. All members shall be expected to engage in activities that promote and support others.

TECHNICAL FOR RESPONSIBLE MANAGEMENT

International practice in the mining industry fully incorporates environment, health and safety in every aspect of the design, operation, and closure of a mine facility. Planning is essential to minimize the disturbed area, to avoid irreversible harm to the environment, accidents and releases to the environment during operation, elimination of potential waste sources, and establishing necessary baseline information to ensure the cleanest closure possible.

EROSION AND SEDIMENT CONTROL

Every effort should be made to limit erosion and the release of sediments into the watercourse. Riprap of some slopes may be necessary to reduce sediment loads while the mine area is still operating. Depending on the water channel, it may be necessary to construct retention ponds to settle out solids before impounded water is allowed to discharge into a natural surface water or stream.

Backfilling of excavated areas and contouring of the land surface may be the best way to minimize erosion on the artisanal mining site. Additional control best management practices can be developed over time as more experience is gained in better mining practices.

One of the principal pollution prevention methods for excavation mining is to backfill the processed areas as soon as possible to minimize land disturbances. Spent crushed materials should be wetted to minimize dust during processing and covered as soon as possible. Drainage systems need to be maintained and any obstructions removed immediately. Recycling of water for washing and using off stream settling of the dirty water before discharge is essential to minimize sediment loads.

Any chemicals on site should be safely maintained to avoid spillage and removed from the site as production is completed or they are no longer needed.

MINE CLOSURE AND RESTORATION PLAN

A mine closure and restoration plan should cover reclamation of tailings, waste rock deposits, any open pit areas, sedimentation basins, and abandoned mine and campsites. Mine reclamation plans should incorporate the following considerations:

- Return of the land to conditions capable of supporting prior land use, equivalent uses, or other acceptable uses;
- Elimination of significant adverse effects on adjacent water resources;
- Use of waste rock for backfill and of topsoil (or other acceptable materials) for reclamation to the extent feasible;
- Contouring of slopes to minimize erosion and runoff;
- Planting of native species of vegetation and of other species that are environmentally acceptable, to prevent erosion and to encourage self-sustaining development of a productive ecosystem on the reclaimed land;
- Use of ditches to divert surface runoff and prevent excessive erosion; and
- Use of dust suppression measures (wetting work areas, roads, and storage piles).

Box E presents typical best management practices for sand and gravel operations. Alluvial diamond extraction is substantially similar in practice to sand and gravel exploitation and consequently these practices represent a good guide for the small diamond-processing sector.

Box E. Best Management Practices for Excavation of Sand and Gravel

1. Gravel excavation should be conducted outside of the stream flow and should be restricted to gravel bar areas.
2. Gravel excavation should be conducted only during low-flow.
3. Gravel excavation should not be conducted during fish spawning season.
4. Only the top of the gravel bar should be excavated.
5. A buffer of ten (10) feet should be maintained between the shoreline and the work area.
6. Gravel should not be stockpiled within the stream channel, but rather removed in a "one-step" manner. The work area should be smoothed over at the end of the day.
7. The frequency of excavation should be limited to the extent possible. For example, remove gravel once during the year and stockpile it at an upland location. Then obtain gravel from the stockpile as needed.
8. To promote bank stability, the removal of streamside vegetation should be kept to a minimum.
9. Streams should not be used as roads to access work areas, except where access is limited to a single perpendicular (90 degree) crossing. The work area should be accessible from land, where possible.

SUMMARY OF CONDITIONS RECOMMENDED FOR PROPOSED PROJECT

In summary, any credit program undertaken would need to be conditioned on:

- General credit worthiness of the party receiving the loan,
- To the extent possible, an assay or characterization of the site to demonstrate some level of return would be achieved and therefore there would be an ability to complete all environmental restitution activities,
- Full compliance with all licensing requirements including financial disclosure and a committed, site-specific reclamation plan as provided with the application for the license.
- A commitment to conduct continuous backfilling of all gravels after washing,
- On-site operations monitoring to identify and immediately respond to any likely obstruction or significant alteration to the natural flow of any stream or water course.

The team is wary if anyone would take advantage of any credit program unless similar conditions were made to apply to the current financing schemes (i.e., those offered by the cartel) employed for most artisanal activities.

Annex 11 provides a more completely developed example of a cooperative proposal received just prior to the completion of this report in draft. While this proposal is more comprehensive than that originally viewed at the MSI offices, it still demonstrates a lack of awareness of many aspects of an enterprise that would be creditworthy to receive commercial credit by failing to address all anticipated cost elements.

THE TERM 'WINNINGS' AT THE ROOT OF THE PROBLEM

While it may appear to only be a matter of semantics, the use of the term 'winnings' to describe the extracted diamonds gemstones is at the root of the problem of the artisanal mining sector. This perpetuates the myth that this is not really a business, but some sort of gaming exercise that may not reflect the full responsibility of the enterprise that it is. The erratic, opportunistic, and modestly constrained artisanal mining activity

indeed seems like trying to beat the odds, but it has significant consequences and costs that are avoided by maintaining this image.

The dealers spoken to are also caught in the power of the ‘big payoff’ and often blindly go into arrangements with license holders and diggers with the hope of having a piece of a giant find of quality stones. They describe their business as often feeding an addiction that defies the logic of any normal business deal.

Mineral resources are a limited commodity that are part of the public good and the extraction of those resources should be looked upon not only for their immediate benefit, but also as opportunities lost if these limited resources are exploited in an irresponsible manner. In a contemporary business climate, the full cost of extraction and remediation of lands after the extraction process should be born by the owners and investors of the enterprise as part of their risk for engaging in the industry. However, in the case of artisanal miners, who have been held to minimal accountability for the specific actions, these risks are significantly born by the citizens of Sierra Leone and the particular communities impacted by poor natural resource practices in the country.

As a first recommendation to USAID and the program activities it supports, we suggest that the term ‘winnings’ not be used in any of the sector rhetoric, to help break the current mindset.

ASSESSMENT OF PROJECT ALTERNATIVES

The standard for evaluating project alternatives is expressed in the Agency’s environmental regulations, in Section 216.6(a): “The purpose of the Environmental Assessment is to provide Agency and host country decision-makers with a full discussion of significant environmental effects of a proposed action. It includes alternatives which would avoid or minimize adverse effects or enhance the quality of the environment *so that the expected benefits of development objectives can be weighed against any adverse impacts upon the human environment* or any irreversible or irretrievable commitment of resources [emphasis added].” That is, an Environmental Assessment is used to develop options, allowing the program managers to choose the most environmentally sound one—as far as practicable. The determination of practicability is where the risks are weighed against the benefits.

NO-ACTION ALTERNATIVE

In an environmental assessment, the “no-action alternative” must be considered. That is, what would be the environmental (including social) impact of simply not taking the action investigated, in this case the action of providing credits to the artisanal mining sector? The team believes that the no action alternative will have the same effect as the proposed project and that the mining will continue to tarnish the landscape, disrupt natural habitats, and pose some additional stresses on human health. The social and economic plight of those involved in the artisanal mining sector will not be significantly changed unless the GOSL and local government authorities become more committed to proper management of limited resources and less influenced by the generation of license fees. Failure to take any actions could result in new civil unrest with negative implications to the overall health of the population as well as increasing stresses to the environment from increased exploitation or even more gross mismanagement of whatever resources might be available.

GRANTS TO COMMUNITIES AND NGOS FOR ENVIRONMENTAL RESTITUTION OF MINED-OUT LANDS – REVERSE MINING

One alternative approach which warrants further examination is to provide credits or grants to NGOs or community-based organizations to actually begin reclamation of mined-out areas using basic mining methods to sift through the gravels, recover any available diamonds, and methodically backfill the land. The recovered diamonds could be used to offset the costs of the land reclamation project with re-flows from the activity going toward funding additional reclamation activities. Because this program is primarily intended to replace gravels rather than to excavate gravels and continue the tradition of abandoning them after washing, the term

‘reverse mining’ is used to distinguish the process. If there were sufficient reflows, some of the funds might also be directed toward some community betterment projects, perhaps along the lines of the DACDF.

Under this ‘reverse mining’ option, the Chiefdom and the Ministry of Mineral Resources would be in a position to declare the plots as ‘worked out,’ ‘spent’ or any other designation they may make to insure that the lands are off-limits to any future mining activities. To achieve such a designation would require that the recovery of stones from a site under the ‘reverse mining’ scheme would be just as efficient as the regular mining activities.

After achieving the highest reasonable level of recovery, these lands could then be converted permanently for more productive uses like agriculture or wildlife habitat. By dedicating some of the lands to natural habitat, it would be easier to justify conversions of other land that seems more suitable for agriculture into permanent production.

One of the principle merits of such a ‘reverse mining’ approach would be to give the Ministry and communities with experience of reclamation of lands, a better understanding of the need for improved stewardship of this valuable resource, and to provide alternative short-term employment for miners and diggers. Such experience could facilitate the Ministry by requiring improved mining practices throughout the artisanal sector by demonstrating how cost effective such ‘reverse mining’ procedures are and refining the reclamation requirements for other active mine sites.

Such an approach would allow the PDA to demonstrate a number of the principles in its ‘code of conduct,’ plus it could provide an opportunity for cooperatives to participate as part of the clean-up/recovery process. The communities could sub-contract with the mining cooperatives to actually organize and perform the work; diggers could be guaranteed a reasonable wage for their efforts as well as possibly be given profit-sharing incentives.

The logistics and complexities of this approach cannot be overstated, but it would appear to be workable particularly if the Chiefs of each Chiefdom and the Ministry of Mineral Resources could be brought on board. On its face, the concept would appear to address each of the major objectives of the MSI program for PDA support:

- Local communities would benefit from the lands conversion, continued employment opportunities, and the possibility of additional community project financing.
- The program would support an increase in accountability by creating an opportunity for the authorities to rationalize the manner which licenses would be granted and demonstrate how appropriate conditionalities can be applied.
- Private sector participation through the cooperatives is made much more viable because of the elimination of traditional creditworthiness issues and the opportunity to focus on building management skills within the cooperatives.

No clear funding level of effort was prescribed for the credit activity that the PEA was originally commissioned for, but even if the anticipated funding level was extremely limited, it could seed the piloting of several of these types of ‘reverse mining’ operations. Perhaps, ultimately, the government’s reclamation fund for artisanal mines could offer the opportunity to make this a self-sustaining program.

CREDITS FOR THE AGRICULTURAL CONVERSION OF LANDS

Another option that warrants consideration is to provide credits directly for the direct conversion of mined lands for agricultural activities. The target clients for such a program could be those who are currently engaged in mining but lack an effective exit strategy to move them into a more sustainable livelihood. This might be done through the formation of specific cooperatives along the lines already laid out by the PDA and

MSI activities. The two women's groups in the Tongo Field that have already taken this kind of initiative provide a limited foundation for setting up similar, but presumably more productive models.

Credits could also be used to facilitate conversion of old mined areas to a more productive use. To be most productive, reclaimed lands for farming should be graded, contoured, and have appropriate drainage controls. Because many of the abandoned workings and re-mined areas have lost top soil, returning the mined out lands to beneficial use may necessitate importation of top soil or nutrient enrichment to the land before turning it to fodder to bring up to minimum agricultural requirements.

As with the 'reverse mining' option, there are several valuable local governance and national resource management lessons that could be gained from such a program. Primarily, the authorities would learn how to effectively take areas out of consideration from certain uses (essentially zoning). Employment prospects from agriculture and agricultural processing and marketing could be enhanced.

Clearly there are a number of major barriers that need to be overcome to make agriculture beyond just a sustainable agriculture level more viable. Transportation links in the country are, at best, dismal. But it would be easier to bring a processed product to the marketplace than raw materials. Consolidation of agricultural production through viable cooperatives could help stimulate sufficient productivity to warrant the investment in processing centers.

A quick review of FAO production information for Sierra Leone suggests that the country has historically been more agriculturally productive for many commodities (e.g., rice) than it is today. From all indications, improving productivity would be relatively easy to achieve.

Another benefit of the shift to agriculture would be that with fewer diggers available to work in the mining sector, those that remained would become at least marginally more competitive and able to demand more reasonable compensation for their efforts. This is among the top priorities of the PDA program.

On the negative side, agriculture is not always environmentally friendly and some effort should be taken to ensure that inappropriate practices are avoided and relevant sustainable agriculture policies are in place and met. The potential use of crop protection chemicals (i.e., pesticides) opens up a whole new realm of environmental concerns. Water management practices by farmers must be done applying the concepts of integrated water management—meaning that the other benefits of the watershed must be preserved (i.e., potable water both from surface and ground water sources, fisheries and natural habitats protected, etc.).

INSTITUTIONAL STRENGTHENING FOR MMR, LOCAL GOVERNMENTS, AND CHIEFDOMS

The last alternative to be assessed as part of this PEA is for USAID to support institutional strengthening for the Ministry of Mineral Resources, Local Governments and the Chiefdoms. To some extent, any alternative that would be undertaken needs to be done so with at least some aspect of institutional strengthening. However, the description of this alternative is presented as if this would be the major focus of the intervention.

Often when assistance organizations embark on institutional support programs, significant focus is given to the legislative framework. Unfortunately, perfect legislation is absolutely no guarantee of any improvements and the team would discourage USAID from putting a strong emphasis on fixing the law at this time. The current mining code does contain a number of inconsistencies that ultimately may require legislative reinforcement at some later time. However, the law sets forth a workable framework under which sensible policy can be implemented. What needs to be immediately fixed is the implementation approach and support systems.

Currently, artisanal mining is being conducted with an absence of viable information and the principal institution to provide much of that information is either not motivated or ill-equipped to do so. The reason that there are few active large-scale operations in place right now is that they are focusing in on defining the

extent of the resource and determining the cost-effectiveness of conducting any type of operations. If minerals cannot be economically extracted from scientifically characterized sites, it is questionable as to how anyone can justify tearing up the earth where no characterization has been made. The whole industry is based on anecdotal information about other people's luck in finding something. This is reminiscent of the Wild West prospectors and miners in the US, some who made their fortune, most who went bust.

Characterizing a mineral area for potential for exploitation is not only sensible for business, it is an essential element in the mitigation of environmental damage from mining. For contemporary mining operations, international environmental practice requires that the area of disturbance be as limited as possible to prevent any unnecessary destruction of habitat, threats to water resources, or an array of other compelling reasons. This basic principal of environmental management has been completely thrown aside in Sierra Leone where they have blurred all the values that are normally associated with resource management into a single drive for revenue. Unfortunately, this seems to be the case at every level of government and there is no viable counterbalance in Sierra Leonean civil society either focused or powerful enough to challenge this trend.

At almost every level, artisanal diamond mining in Sierra Leone is irrational. Irrationally functioning institutions are clearly at a disadvantage to sort out the problems, particularly since those institutions often have yet to acknowledge the full set of contributing factors to and to what extent they are part of the solution or actually part of the problem. In Sierra Leone, this is aggravated further by the high degree of visible poverty that reinforces a tendency to systemically complain about resource constraints. For the most part, all organizations have some sort of resource constraints and this must be factored into practical policy approaches that maximize the effectiveness of these limited resources. In the artisanal diamond sector, it is clear that at least three governance institutions have some interest in participating in the direct management or oversight of the sector. Good policy would look toward leveraging this opportunity, something that Sierra Leone is just beginning to do now as the Local Councils are devolved into more general authority. The establishment of a workable arrangement might benefit from the facilitation of a donor supported broker to assist each of these government institutions in defining the value system that they are responsible for preserving, with respect to mineral resources and collaborative approaches toward maintaining their values. However, key to the success of any collaborative effort is the sharing of information, something that appears to be woefully lacking. Chiefdom councils say they do not receive regular reports from the MMR regarding license applications or mineral lease arrangements that might remove some applicant mining plots from consideration for a license.

The license issuance policy and process needs to be re-examined. Unfortunately, the MMR seems to regard a license as a 'right' rather than a privilege that can only be granted and kept if all other conditions for that privilege are met. (One of the MMOs during our focus group actually related the right to mine as one that should be protected as a 'human right.' This is hardly the perception that effective regulatory officers normally hold.)

The first condition that is typically overlooked by the authorities is a complete application. Short-cutting by the MMO at the application stage effectively undermines any respect for their authority at the implementation stage. The application provides the opportunity to more effectively screen operations for their overall viability, identifies other potentially responsible parties (i.e., the sponsors) who might be held culpable for any failure of the license holder to perform within the conditions of the license, ensures that the license holder is prepared to meet their responsibility under the law for reclaiming the lands which they mined, and any other conditions that the MMR determines are appropriate to more effectively manage the mineral resources in conformance with its policies.

Another key area that should be closely examined is the sequencing of the license issuance process and the possibility of having a centralized authority (i.e., Freetown) make the final decision on license issuance. The advantage of re-centralizing part of the process is that it would provide some oversight of the District Office's recommendations on permit issuance as well as a check on the Chiefdom authorities taking rents before the license is issued. Since the issuance of a license should generally be considered a privilege for which the public may have an interest, the process changes should provide some opportunity for public

notice and comment on the issuance before the license becomes effective. All this may sound contrary to the one-stop shop license idea promoted by the PRSP, but if built around a regular notification cycle, it could be executed with relative ease.

Other specific policy areas for the artisanal sector that warrant examination and possible development of appropriate policy include:

- Establishing clear threshold criteria on acceptable mining areas (e.g., carats per cubic meter, overburden to gravel ratios, etc);
- Establishing a clear abandoned site policy on clean-ups that provide for joint and severable liability for both the license holder and supporters for acceptable closure;
- Technical Assistance to Artisanal Miners, including training on improved mining techniques, best management practices, and environmental management and reclamation criteria. This might also include meaningful technical criteria that must be verified before anyone is certified as a mine manager; and
- Establishing reporting responsibilities of artisanal mining license holders, including labor force information, identification of equipment used on site, and any appropriate production information (e.g., overburden removal volumes, gravel volumes, recovery rates, etc.).

Currently, the World Bank, UNDP, and DfID are working with the government to pilot and later implement a cadastre system to help better demarcate licensed mining plots. Annex 10 provides a brief overview of that project. The database for the cadastre system could easily include relevant information on the licensing process related to conformance to the management conditions and environmental requirements. The database could facilitate information sharing between local government and the MMR. Since this project is just being developed now, it may be a prime opportunity to incorporate the necessary data elements in the cadastre computerization program.

Although the MMR would claim that it has inadequate human resources to effectively undertake its mission, that would be an oversimplification of the problem. For a country the size of Sierra Leone, there appears to already be a significant number of personnel assigned to the field, although logistics and the mobility of these various agents limit their effectiveness. Local government personnel have also been assigned duties that could be made to supplement the MMR staffing levels. A functional analysis should be undertaken to examine the roles and responsibilities of all these participants in the regulation of the artisanal sector. The analysis should step back from the current management practices of these organizations and look at what they should be doing to responsibly protect their organization's interest. Efforts should guarantee that the most important functions receive priority when assigning staffing levels. Consideration should be given to eliminating functions of marginal value. Only after this kind of assessment is completed might a statement of inadequate staffing be considered for its merits.

SIMILARITIES AND DISSIMILARITIES TO ARTISANAL GOLD MINING AND PLACER

The intensity of artisanal gold mining activities in Sierra Leone is a much lower scale than diamonds, but may be somewhat more widely distributed throughout the country. Artisanal gold mining also relies on basic hand methods to find gold flakes in the alluvium and might involve some sort of gravity separation (e.g., panning, sluice boxes, etc). While the damage from the physical mining processes is similar to diamonds, there are significant additional concerns for gold. First, gold bearing formations are likely to be much more mineralized than most diamond formations and the disturbance of gravels has a greater potential to mobilize other heavy metals that might have settled out in the sediments. These materials may be extremely toxic to aquatic organisms living in the stream segment and should be characterized during the mining operations. An even greater concern is that gold mining, even at the artisanal level, may involve chemicals to enhance separation of the gold. Mercury is frequently used to absorb the gold and then burnt off to release the mercury as a gas yielding a gold concentrate. Mercury is extremely toxic in both a water column as well as a gas. There are many horror stories of miners actually poisoning themselves in making mercury amalgams.

While most artisanal miners never attempt to do beneficiation (processing) of gold ore materials, cyanide solutions are a common means to solublize the gold for recovery later. Unfortunately, failure of this leaching process is extremely common and has been the cause of the most devastating environmental disasters experienced in the mining industry. Caution must be taken not to merely apply the same environmental management conditions on artisanal gold as might be applied for diamonds.

SUMMARY AND CONCLUSIONS

Artisanal diamond mining in Sierra Leone has been a source of livelihood for tens of thousands of diggers and miners for the last 60 years. Despite representing nearly 90% of the export level of diamonds for the country in 2004, the sector does not appear to be very reliable to improve the overall welfare of Sierra Leone in the future. Much of the profits that may be gained from artisanal mining are the direct result of avoided costs in proper management of the country's natural resources. In addition, there is significant evidence that recoverable alluvial diamond resources in the country are rapidly being depleted. Unfortunately, the GOSL appears to be promoting an expanded role for artisanal mining as part of its poverty reduction efforts. While artisanal mining may provide limited opportunities until a more sustainable economic base begins to take root, we believe that continuing to subsidize the industry by waiving responsible management is shortsighted policy.

Some of the current artisanal mining activities have the potential to evolve into more responsible small-scale operations that conform to normal business models. However, structural changes to the sector need to be undertaken to the following problems:

- Roles and Responsibilities of Authorities are perverted – conflict of interests and the opportunities for corruption within these authorities is rampant.
- Incentives within the sector are not balanced and decisions seem to be more motivated by trying to increase fee revenues than manage the lands and mineral exploitation. This includes Chiefdom authorities that appear to overlook their land stewardship obligations in order to increase surface rent receipts.
- The lack of understanding or current characterization of the mineral resources exacerbates the issues—the current system allows the country to be torn up even in areas where mineral extraction appears to be unviable.
- The entire industry is cloaked in secrecy—operating agreements are often informal and do not capture all responsible parties and their duties; the disclosure requirements that are contained in the law are routinely disregarded.
- Local governments, Chiefdoms, and the people of Sierra Leone seem naive as to the cost being born by the country for inadequate management of its mineral resources.
- Donor support to the diamond sector is being provided to reduce illicit mining and the illegal smuggling that has plagued the country in the recent past, fuelling internal conflict, and possibly helping to finance part of the global terrorist threat.

The availability of credit was identified as one of the major barriers for restructuring the sector to make it more competitive and break the monopoly that appears to control most aspects of the industry in Sierra Leone. This Programmatic Environmental Assessment examined the credit proposal as conceptualized by the Peace Diamond Alliance with the support of USAID-funded technical assistance from MSI. The assessment team believes that the condition for the credit model proposed by PDA is not ripe and, although mitigations to minimize any environmental consequences of mining activities can be established, the overall impact of the program will be negligible. Under the credit program supported by USAID, mining operations would have to conduct environmental remediation activities that they are avoiding through their current financing arrangements. This avoidance is despite the responsibility under the current law. Unless the government takes steps to ensure that all mining operators undertake these environmental responsibilities, the avoided costs result in a distortion that makes the current financing system more attractive. Artisanal diamond mining

operators do not follow rational business models exacerbating the high credit risk problem generally faced by the mining sector. We believe that any credit facility following the general model promoted by PDA would not be utilized and the environment would continue to be torn up, as is currently the case.

Four other alternatives were examined in this assessment. The one that the team believes has the most merit is the 'reverse mining' concept that involves the clean-closure of mining plots and the recovery of the diamonds as a secondary bi-product. This option provides the opportunity for PDA to demonstrate many elements of its 'code of conduct' as well as alternative financing for mining activities that could continue to provide short-term livelihood support for many of the diggers currently working in the sector.

For the long-term, it is essential that the GOSL revisit its entire approach to artisanal diamond mining and look for an exit strategy for the tens of thousands of people trapped in the cycle of poverty it currently represents for them. Overall governance of artisanal diamond mining may be a microcosm of the entire governance problems currently faced by Sierra Leone. The sector must become much more transparent, policies must reflect a wider set of values than simply focusing on revenues, and checks and balances must be put in place to stop the abuses of authority by officials who appear to act only on their personal behalf.

Sierra Leone's diamonds are presented as the country's blessing; action is needed to ensure that they are no longer a curse.

ANNEX I: SCOPING STATEMENT FOR SIERRA LEONE SMALL SCALE ARTISANAL MINING PEA

SUMMARY

In Sierra Leone, it is estimated that up to 200,000 people are active in artisanal and small-scale mining of diamonds. Most of these individuals employ primitive techniques using only hand tools to dredge alluvium from streambeds to find gemstones which they can sell off to other intermediaries. Small scale artisanal mining is characterized as: labor intensive, low skilled, low paying, having low productivity, subject to exploitive intermediaries, and conducted with a general disregard of any environmental, safety or health impacts of the sector.

As of the December 2, 2003 District Recovery Committee Report for the National Recovery program, a total of 856 current artisanal mining licenses were active in the 6 traditional mining chiefdoms of Nimiyama, Nimikoro, Tankoro, Gbense, Kamara and Sandor. As a way of encouraging legal mining, Chiefs were presented with a percentage based on the sale of licenses in their various Chiefdoms and diamonds legally purchased from their Chiefdoms.

Small scale artisanal mining permits cover an area not to exceed 5 acres and are valid for up to two years with an option to be extended for an additional year. Renewals are granted conditioned on compliance with applicable national mining requirements. Licenses are only granted with the approval of the Chiefdom Mining Allocation Committee. The estimates of the number of unlicensed (illegal) mining operations range from about 20% to 50% additional operations in the region.

The African Development Bank, in its July 1995 country environmental assessment, estimated that 80-120,000 ha (approximately 200-300,000 acres) had been destroyed by mining in Sierra Leone, mainly around Mokanje (bauxite mining), Gbangbatoke (rutile mining), Marampa (iron ore), Kenema (chromite), Yengema, Sefadu, Koidu, Tongo and the alluvial terraces of the Sewa Male, Rokel, and Pampana Rivers (diamonds and gold). Although the license fee includes a portion that can be used to defray the cost of rehabilitation and reclamation of mined out areas, the fund is woefully inadequate and has only had limited application.

Among the environmental problems of diamond artisanal mining are increased sediment loads in rivers, river bank and stream channel degradation, destruction of benthic systems and fisheries, disruption of downstream beneficial use of waters, deforestation, removal of vegetation and disruption of natural habitats with an impact on biodiversity and bio-density, shift of land use away from traditional agricultural activities, water contamination from increased and unregulated human waste, and increased vector breeding in open pits and trenches which were abandoned after working the artisanal mining areas.

Major social problems associated with the activity include high accident rates in the mines, high rates of HIV infection, land conflicts caused by the presence of large transient populations, crime, poor sanitation, and child labor.

Contrary to the general perception that Kono is purely a mining district, there is huge agricultural potential. The district is one of the major producers of cocoa and coffee, though this is overshadowed by diamond mining. Frequently, there are clashes between the farming communities and the mobile artisanal miners who

are creating health hazardous conditions for the resident farmers. To examine this issue more closely, we will focus on small-scale mining and its environmental impact on the communities affected by mining activities.

According to the USAID sponsored Peace Diamond Alliance Program, access to credit was identified as a major constraint to legal and more efficient small-scale artisanal mining activities. The program speculates that providing credit opportunities will stimulate the formation of mining cooperatives that will agree to adhere to a “mining code of conduct” that encompasses better environmental management.

However, at least three micro-credit facilities have already been established to serve the Kono District including schemes being implemented by GTZ, World Vision (SL), and DIOMPLOR/DFID. According to the December 2, 2003 District Recovery Committee Report for the National Recovery program, most beneficiaries have used the loan money to finance mining programs. The report notes that the outcomes of these activities are uncertain.

PURPOSE

The purpose of this Programmatic Environmental Assessment is to assist in the development of a program for possible USAID support to the Artisanal Mining sector in Sierra Leone. The objectives of such a program would be to establish a finance facility mechanism that facilitates small scale legal mining operations undertaken in an environmentally sound manner with an emphasis on minimizing any adverse impact to the environment. The assessment will identify practical conditionalities that might be imposed, a process for screening specific investment proposals, recommendations as to best practices for environmental management of small-scale artisanal mining activities, and mechanisms for monitoring project conformance with required conditionalities and the effectiveness of the environmental mitigation program included in the USAID sponsored lending activity.

ALTERNATIVES

Among the alternatives that are being considered for examination are:

- no action,
- identification of best management practices for artisanal mining operations,
- capacity building of institutions to better manage artisanal mining operations and environmental controls, and
- establishment of a watershed approach.

INSTITUTIONAL CAPACITY BUILDING

Efforts in this area may be essential to promote continued site remediation of active workings as well as the establishment of an abandoned mining area remediation policy. The existence of a state managed remediation fund makes this a plausible alternative.

The Ministry of Mineral Resources is responsible for the licensing of artisanal operations and a quick review of their legislation and procedures indicates numerous opportunities for improved environmental management within the framework of the existing laws. Significant efforts may need to be made to establish more effective inspection and license re-issuance protocols that actually hinge on the historical environmental performance as is actually required under the existing law.

As background information, the Environment Protection Division of the Ministry of Lands, Country Planning and the Environment presented its responsibilities in a recent communication to the government. Following is a list of what it regards as its charge:

1. Conduct field visits to areas within the country where environmental management problems are evident.
2. Publish a quarterly Environmental Bulletin.
3. Provide a Focal Point for all National and International Environmental management issues, make payment of annual contributions and membership dues to multilateral environmental agreements/Conventions, Protocols and Environment Trust Funds, of which Sierra Leone is a party.
4. Ensure payment of Environmental Impact assessment (EIA) licenses fees by companies and project proponents.
5. Monitor the implementation of environmental mitigation plans of companies and projects which have undertaken EIA.
6. Undertake environmental education and awareness raising programs nationwide.
7. Facilitate environmental research and baseline data collection on the state of the environment and disseminate the information to the public.
8. Coordinate and monitor the implementation of environmentally-related activities carried out by government line ministries and environment non-governmental organizations.
9. Encourage community participation in environmental management programs.
10. Establish links and areas of cooperation with regional, sub regional, and international environmental organizations and institutions.
11. Celebrate important calendar days of the United Nations Environment Program including the World Environment Day Celebration.
12. Develop environmental standards, regulations and bylaws for the effective implementation of the National Environment Protection Act, 2000.

Unfortunately, what is lacking is any process for actual management of environmental issues.

THE WATERSHED APPROACH

The remediation of contamination associated with small-scale artisanal mining must be considered on a site-by-site basis. However, one possible cost- and time-efficient alternative may be to identify, characterize, and remediate sites that most substantially affect watershed quality and threaten public safety.

Remediation of an entire fluvial system is unrealistic; instead, technology should be developed to address the hot spots of pollution occurring in the system... In fluvial systems, targeting key areas is essential to obtain the greatest benefit from scarce resources.

Such a watershed approach: (1) gives high priority to actions likely to improve water and ecosystem quality most significantly, (2) will greatly accelerate and reduce the total cost of remediation compared to remediating on a site-by-site basis, (3) enables assessment of the cumulative effect of multiple and/or nonpoint sources of contamination, (4) provides information at the watershed scale that will assist disposal siting decisions, (5) permits consideration of revenue generation from selected sites to supplement overall watershed remediation costs, and (6) fosters collaboration among multiple stakeholders.

The watershed approach normally involves four elements:

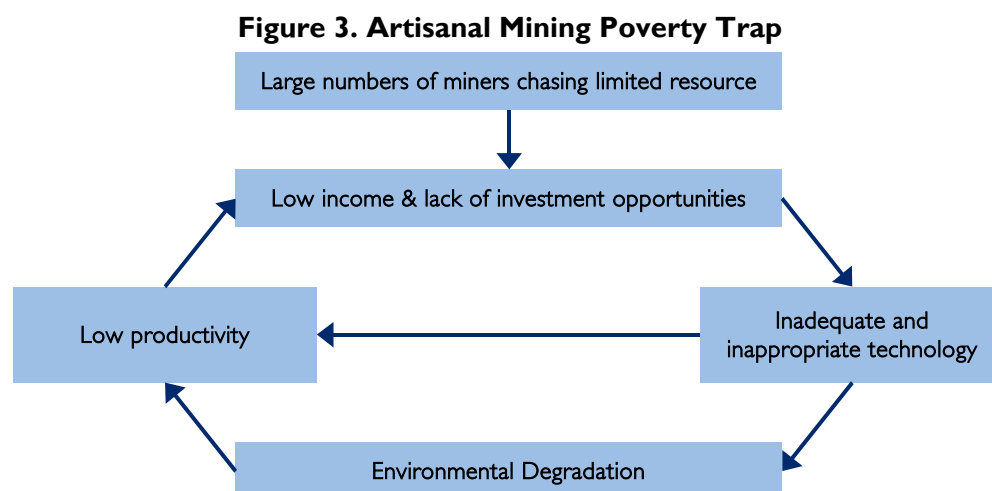
- **Statewide analysis/watershed prioritization:** Information is compiled and integrated to enable prioritization of watersheds within a state for further study. Data on the physical, biological, and human factors that are related to acid mine drainage are collected and integrated on a state scale. Stakeholders will use these data, along with information from other sources, to prioritize watersheds for detailed characterization and remediation.
- **Watershed characterization:** Within the selected watershed, the extent, sources, and effects of contamination are characterized. A conceptual understanding of the processes that control the occurrence and transport of contaminants is developed. Sites attributed with the greatest possibility of having deleterious effects on water quality and biota are identified, and the magnitude of the effects are estimated. Monitoring is designed and conducted at the watershed scale. Stakeholders will use this information to prioritize sites for remediation.
- **Site characterization in support of remediation:** Detailed geologic, mineralogic, hydrologic, and biologic characterization of sites targeted for remediation is conducted. Processes controlling the occurrence and transport of contaminants from the sites are described. The monitoring network is expanded to include data on baseline conditions in the vicinity of the sites. This information is used by stakeholders to define realistic remediation goals, and to design and implement effective remedial measures.
- **Monitoring:** A monitoring network to measure indicators of improvement in watershed quality and to evaluate the effectiveness of remediation is designed, and operated.

AFFECTED ENVIRONMENT

Watershed around Kono region – this site is being visited the week of January 10th and this data will be fully supplemented.

ENVIRONMENTAL CONSEQUENCES

The social and environmental consequences of small scale artisanal mining are a subject of intense interest. Being a low capital investment activity, there is a tremendous draw to diamond mining to help raise many out of their poverty condition in this country of limited economic activity, poor infrastructure, and repressed literacy. However, it is not clear how the benefits of this sector truly impact the quality of life of the average miner or his/her family. UNHCR characterized small scale artisanal mining as a poverty trap as illustrated by the following graphic:



Listed below are some of the more significant safety, health and environmental concerns that need to be examined as part of this programmatic assessment:

SAFETY-CRITICAL ISSUES

- No protective clothing.
- Unsafe working places, that is, disused mines, unplanned mining, and no benching.
- No training in use of explosives.
- No first-aid training and kits or equipment.
- No safety awareness on use of chemicals, for example, cyanide, mercury, and general safety.

HEALTH-CRITICAL ISSUES

- Poor sanitation.
- Malaria, Cholera, TB, STIs, HIV & AIDS
- Poor living conditions.
- Poor diet.

“A study carried out in southwestern Sierra Leone (Gbakima) indicates the prevalence of schistosomiasis and other parasitic diseases. Urine and fetal samples from mine workers and their dependents from selected residential diamond mine camps in Bo Town and Tongo Field revealed that there was widespread infection in the community. The study concluded that abandoned diamond workings provide a habitat suitable for *Biomphalaria pfeiffer*, the snail vector for the disease, *S. Mansoni*. *Biomphalaria pfeiffer* has been found in large numbers in most streams and ponds in southwestern Sierra Leone, particularly in the Tongo area and the number of incidences of *S. Mansoni* in the Tongo Field hospital are reported to have increased dramatically. The study further concludes that diamond mining on a large scale and swamp rice farming can eventually contribute to a prevalence of schistosomiasis, a major parasitic disease, which can be fatal to young children.”

ENVIRONMENT— CRITICAL ISSUES

A preliminary list of the relevant issues is provided below. Because very little characterization of these problems as they are associated with artisanal mining have ever been conducted, additional data gathering on site is necessary to fully describe the scope and degree of significance of each.

- Soil Degradation – erosion and top soil problems form siltation;
- Water Quality Degradation – siltation of rivers and water pollution;
- Altered Hydrology and Stream Channel Characteristics – Gullies and trenches pose great danger to animals and human beings. Channels unstable, river bank stabilization concerns;
- Land Use;
- Damage to Wetlands;
- Species and Habitat Loss; and
- Deforestation.

PEA ENVIRONMENTAL ASSESSMENT PREPARATION

TIMING OF ASSESSMENT PREPARATION

In order to carry out PEA, the scoping team envisages the following arrangements, methods, timing and phasing:

- **Continuing consultative process:** This draft scoping statement will be sent to the USAID Mission cognizant technical officer for appropriate distribution and coordination with other USAID offices (including, but not limited to the BEO and MEO). General consultations and data collection will continue in accordance with this scoping statement, subject to any adjustment or modifications recommended by the USAID Mission.
- **PEA Preparation Period:** The proposed period of implementation of PEA will be about 30 days, commencing on or about February 3, 2005. Following is the general schedule for the work to be performed:

INITIAL WORK COMPLETED

Prior to arriving in Sierra Leone, the team conducted an extensive review of readily available documents and compiled an electronic library of information, including:

- pertinent information pertaining to similar EAs in other African countries; and
- assessments and studies of the alluvial diamond mining sector in Sierra Leone, the sub-region and/or region.

The team scheduled several in-country meetings to discuss preliminary work plan and implementation schedule.

TASKS SCHEDULED FOR THE REMAINING WEEK THROUGH JANUARY 8, 2005

A draft detailed workplan is in preparation as well as the illustrative outline of the final EA report. We anticipate providing USAID with a copy of a draft environmental scoping statement for initial comment by COB, January 5, 2005.

Consultations with GOSL officials, other donors, NGOs, industry representatives, etc. in Freetown to assist in the completion of the workplan as well as provide valuable data for the final EA. Preliminary list of contacts in Freetown scheduled (or currently being scheduled) for meetings is included as Attachment A.

TASKS SCHEDULED FOR NEXT WEEK – JANUARY 10-16, 2005

- Commence initial Field Visits for interviews outside of Freetown
- Return to Freetown o/a January 16, 2005

TASKS SCHEDULED FOR THE WEEK OF JANUARY 17-22, 2005

Workplan for PEA will be finalized on or about January 18, 2005 to allow for preliminary comments from USAID prior to commencing the next weeks activities. Consultations shall continue during the USAID comment period.

- Consultation Workshop for Key Counterparts – on or about January 19, 2005
- Continue to assemble relevant environmental and sector data
- Further develop option analysis

- Additional Consultations in Freetown

TASKS SCHEDULED FOR THE WEEK OF JANUARY 24-30, 2005

- Resume Field Visits for interviews outside of Freetown
- Continue to assemble relevant environmental and sector data
- Refine option analysis

TASKS SCHEDULED FOR THE WEEK OF FEBRUARY 1-6, 2005

- Complete Draft PEA Report
- Conduct PEA Results Workshop for Counterparts – February 2, 2005
- Submit Draft PEA to USAID for Comments – February 3, 2005

REPORT PREPARATION AND REVIEW:

The following plan for the preparation and review of the PEA report is foreseen: draft PEA report prepared and compiled, with contributions from each team member, a one day workshop in Freetown, Sierra Leone with the participation of USAID, donor and non-governmental organizations, preparation of a final draft incorporating the comments and suggestions made during the workshop, submission of a post-workshop PEA to the USAID Mission cognizant technical officer (for submission to BEO per Mission procedures), and completion of the final report following receipt of all relevant comments through the USAID Mission cognizant technical officer.

PARTICIPATING DISCIPLINES

Disciplines participating in the assessment will include:

- Project Manager / Team Leader
- Hydrometeorologist / Geographer
- Social Anthropologist

ATTACHMENTS (NOT INCLUDED)

- Map of Sierra Leone
- Map of agricultural production in Sierra Leone
- Map of NGO/IO activities in Sierra Leone
- Photographs

SCOPING STATEMENT ATTACHMENT: LIST OF CONTACTS FOR CONSULTATION

NGO CONTACT PERSON

Save Heritage and Rehabilitate the Environment
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Ph/Fax: 223361
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Olayinka Creighton-Randall
Campaign for Good Governance
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Tengbeh Town
Freetown
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Website: www.slccg.org

Save the Children
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Micheal Possmayer
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Website: www.merlin.org.uk

DONOR CONTACT DETAILS

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Frank Kerefa Smart (met with on 1/05/05)
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076 611-929
e-mail: dipam@sierratel.sl
www.peacediamonds.org

Nick Webber
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Fax: 232-22-234-280
E-Mail: caresl_general@sl.care.org
Website: www.careinternational.org.uk

Mr. Leslie Scott
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Website: www.worldvision.org

Tommy Garnet
Environmental Backroads
efasl@sierratel.sl

Francis Fortuna
Search for Common Ground

Brian Gleeson
Richard Conti
CRS
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Freetown, Sierra Leone
Tel: 232.22.236.093
Fax: 232.22.228.646
Email: crs@sierratel.sl
Website: www.catholicrelief.org

John Kanu (met with on 1/05/05)
Daniel Samu (Tongo area) – met with on 01/06/05
Tamba Santi (Kono area) – met with on 01/06/05
DIPAM
076 654 265

Trade Association of Artisanal Miners

Paul Temple (met with on 1/05/05)
MSI Sierra Leone
47 Wellington Street
Freetown – Sierra Leone
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Cell: 232-76-665-797
076 611-929
e-mail: paul temple74@tiscali.co.uk
www.peacediamonds.org

MOCCY

Ezekiel Dyke
United Mine Workers

Chief Kono Bundu
Freetown

Rahall
Environmental NGO

Pemagbi
Human Rights NGO

Abdulai Jalloh (met with on 01/04/05 and 01/05/05)
USAID

D. Annette Adams (met with on 01/05/05)
Mission Director, USAID Guinea and Sierra Leone

Kebbie
Ministry of Local Government

Sillah
Koidu Holdings

Zainab Bangura
Human Rights Activities

Seray Wurie
Law Reform Commission

Microfinance Facility Operation in SL

UN UNAMSIL Area Survey
UNOCHA

GOSL

MINISTRY OF AGRICULTURE, FORESTRY AND FOOD
SECURITY
First Floor Youyi Building, Freetown
Tel. 222242 / 226489 / 240768 / 222907

MINISTRY OF ENERGY AND POWER
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Tel: 226566

MINISTRY OF LANDS, COUNTRY PLANNING AND
THE ENVIRONMENT
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Tel: 225141 / 240973

MINISTRY OF LOCAL GOVERNMENT AND
COMMUNITY DEVELOPMENT
Sixth Floor Youyi Building, Freetown
Tel: 227275

Ministry of Labour, Industrial Relations and Social Security
Minister: Mr. Alpha Timbo
New England, Freetown
Tel: 241947

MINISTRY OF MINERAL RESOURCES
Osama Kamara, Deputy Director of Mines
Rashid Wurie, Director of Mines (met on 1/05/06)
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Tel 240142

MINISTRY OF HEALTH AND SANITATION
Minister: Ms. Agnes Taylor-Lewis
Fourth Floor Youyi Building, Freetown
Tel: 242119

MINISTRY OF TRADE AND INDUSTRY
Minister: Dr. Kadie Sesay
Sixth Floor Youyi Building, Freetown
Tel: 222755 / 222706

MINISTRY OF YOUTH AND SPORTS
Minister: Dr. Dennis Bright
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Tel: 241640

Ms Sarah Muscroft
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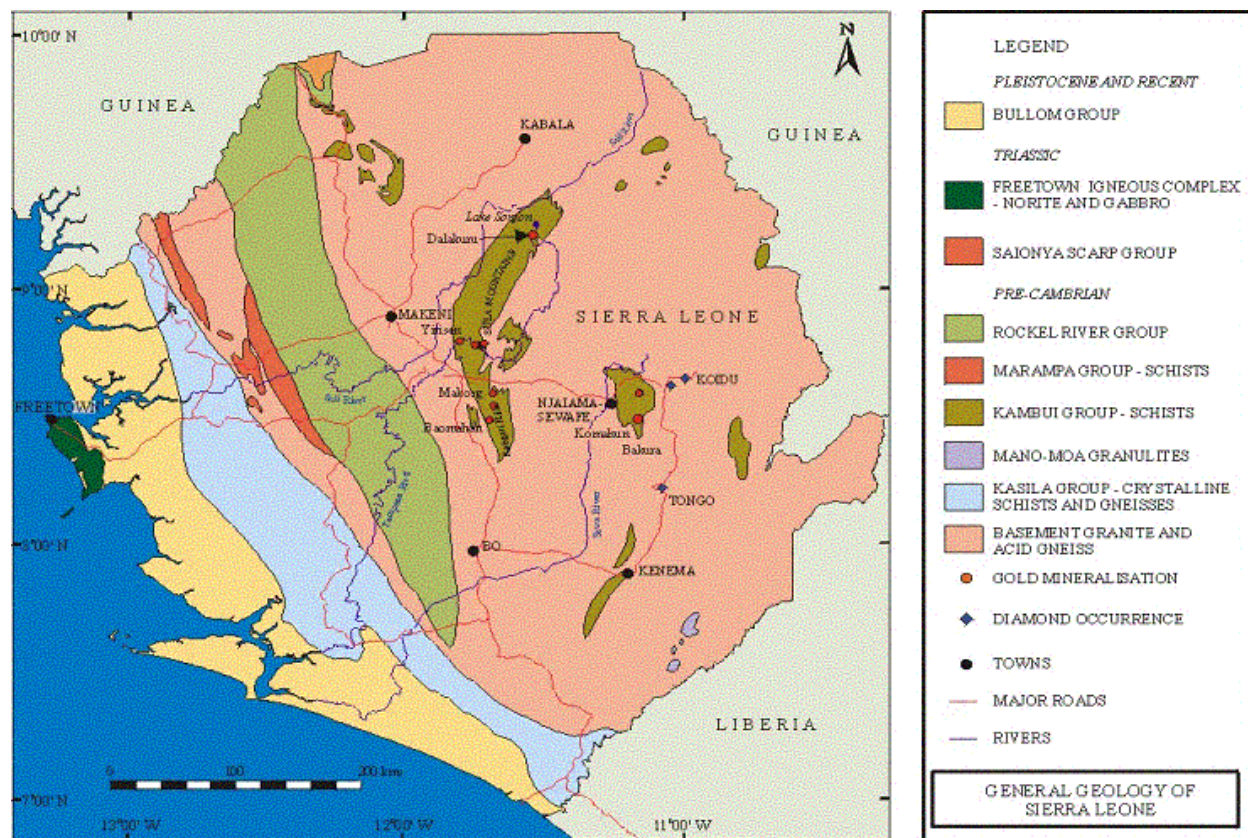
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ANNEX 2: MAP OF SIERRA LEONE MINERAL RESOURCES

Taken from the *Government of Sierra Leone Journal of Mining*, February 2003 Supplement



ANNEX 3: INITIAL ENVIRONMENTAL EXAMINATION OR CATEGORICAL EXCLUSION

PROGRAM/ACTIVITY/PROJECT DATA:

Program/Activity Number:

Country/Region:

Program/Project Title:

636-002 (SpO 2)

Sierra Leone

Special Objective 2: Democratic Governance

Strengthened

Funding Begins: 2001

Funding Ends: 2006

LOP Amount: XXXXXXX (amount removed from this copy)

Sub-Activity Amount: N/A

IEE Prepared By: Abdulai Jalloh / USAID/Guinea (Sierra Leone Program)

Current Date: 5 June 2004

IEE Amendment (Y/N): N If "Yes", number and date of original IEE:

ENVIRONMENTAL ACTION RECOMMENDED: (Place X where applicable)

Categorical Exclusion: X

Negative Determination:

Positive Determination: X

Deferral:

ADDITIONAL ELEMENTS: (Place X where applicable)

EMEMP: N/A

CONDITIONS: X

PVO/NGO:

SUMMARY OF FINDINGS:

This IEE addresses all activities under Special Objective 2 (Democratic Governance Strengthened) of the Sierra Leone Transition Strategy, replacing the previous IEE for this program of activities, 31 Sierra Leone SpO2 Strengthened Democratic Institutions, 07/12/01. The original Transition Strategy (and associated IEE's) covered the period FY 2001 – FY 2003. The Sierra Leone Transition Strategy has subsequently been extended through FY 2006, and this IEE covers this 3-year extension. This SpO calls for assistance in three main areas: (1) Broadening community-based political participation (2) Promoting civic dialog and informed participation in public affairs and (3) Strengthening the efficiency of Government of Sierra Leone and local communities to manage the diamond mining sector. As a result of this assistance, local people – including women and youth – are equipped with the information and skills they need to participate in decision-making, tackle corruption and contain human rights abuses with a view of ending the cycle of violence and ensuring security and stability. At the national level USAID assists the Government of Sierra Leone to wrest control of the country's diamond resources and involve local communities in the management of the resource, thereby increasing the benefits of the diamond trade for both Government and local communities where diamonds are mined.

All but one of the foreseeable activities to be carried out under this Special Objective are primarily concerned with the provision of technical assistance, training actions, information transfer, institutional capacity building and civic education and are not expected to have any direct impact on the environment. Therefore, they are recommended for **Categorical Exclusion** per 22 CFR 216.2(2) (i) and (v).

A new activity of the SpO – a credit program for diamond miners – is recommended for a **Positive Determination**, per 22CFR216.3(a)(2)(iii), and an environmental assessment (EA) must be prepared. This credit program is designed to enable disadvantaged and exploited miners to gain a fair share of the markets and sell at competitive prices. Since there are potentially significant environmental consequences from alluvial diamond mining, an EA will be required.

Given the relatively small size of the credit activity (*illustrative funding level noted removed from this copy*) and the availability of local expertise regarding diamond mining and environmental issues, the scope of work for the EA will call for a modest yet comprehensive assessment conducted by local experts. The scope of this assessment must be determined following procedures described in 22CFR216.3(a)(4), and the content of the assessment must follow the requirements of 22CFR216.6. Mitigation actions for the implementation of the credit program for miners will be spelled out in the pending EA.

As required by ADS 204.5.4, the SO team must actively monitor ongoing activities for compliance with approved IEE recommendations, and modify or end activities that are not in compliance. If additional activities not described in this document are added to this program, then amended or new environmental documentation must be prepared. The SO team will also ensure that provisions of the IEE concerning mitigative measures and the conditions specified herein along with the requirement to monitor be incorporated in all contracts, cooperative agreements, grants and sub-grants.

APPROVAL OF ENVIRONMENTAL ACTION RECOMMENDED: (Type Name Under Signature Line)

CLEARANCE

Acting Mission Director: _____ Cleared _____ Date: _____ June 7, 2004
David Atteberry

CONCURRENCE

Bureau Environmental Officer: _____ Cleared _____ Date: _____ July 2, 2004
Paul des Rosiers

Approved: _____X_____

Disapproved: _____

File No: 34SierraLeone2_SpO2.doc (AID/W)

CLEARANCE

General Counsel (Africa Bureau): _____ Cleared _____ Date: _____ June 28, 2004
John Cardenas

ADDITIONAL CLEARANCES:

Regional Environmental Officer: _____ Cleared _____ Date: _____ June 7, 2004
Robert Clausen

Regional Environmental Advisor: _____ Cleared _____ Date: _____ June 21, 2004
Brian Hirsch

Sierra Leone Special Objective 2

SPO 2: Democratic Governance Strengthened

1.0 BACKGROUND AND ACTIVITY DESCRIPTION

For over a decade, Sierra Leone has been embroiled in civil war that has claimed at least 20,000 lives and forced almost half of the country's 5.2 million inhabitants to flee their homes. With the support of the United Nations peacekeeping force and the assistance of the international donor community, the Government of Sierra Leone (GOSL) has been struggling to keep the fragile peace alive and to rebuild its war-torn country. As Sierra Leone continues its recovery from 11 years of conflict, destruction and massive population dislocation, an important part of that recovery process involves helping Sierra Leoneans address both the root causes and effects of the war and prevent the outbreak of renewed fighting in the future. One of the contributing causes of the recent conflict was bad governance, in particular, disconnection of leaders from the communities they were meant to serve, corruption and lack of accountability, over-concentration of power; absence of the concept of "public service" among leaders, and low capacity of local organizations and communities to participate constructively in political dialogue. In addition, key components of society – youth and women – were marginalized. The effects were dysfunctional and broken communities, militant youth groups that use confrontation as their main advocacy tool, women who are often timid to enter political dialogue and leaders who have had no good role models to emulate.

USAID intends to support a comprehensive, multi-donor effort aimed at restoring peace, security, and stability of Sierra Leone through implementation of two Special Objectives: 1) Advancement of the reintegration process for war-torn populations in targeted communities and 2) Strengthened democratic governance in targeted areas of Sierra Leone.

This IEE is directed at Special Objective 2 (Democratic Governance Strengthened) in targeted communities which calls for assistance in three main areas: (1) Broadening community-based political participation (2) Promoting civic dialog and informed participation in public affairs and (3) Strengthening the efficiency of Government of Sierra Leone and local communities to manage the diamond mining sector. As a result of this assistance, local people – including women and youth are equipped with the information and skills they need to participate in decision-making, tackle corruption and contain human rights abuses with the intent of ending the cycle of violence and ensuring security and stability. At the national level USAID assists the Government of Sierra Leone to better control the country's diamond resources and involve local communities in the management of the resource, thereby increasing the benefits from diamonds to both Government and local communities where diamonds are mined.

The achievement of this SpO will be measured by three indicators: (1) Number of public meetings that articulate issues of public concern (2) Number of networks formed that include those who are marginalized (3) Increased revenues allocated to diamond-producing communities from the Diamond Area Community Development Fund. USAID's work in the diamond sector will build on the latest analysis of the legal, regulatory and financial and marketing aspects of the diamond industry. The program will bring online a credit facility to help local miners break the debt-bondage arrangements under which they currently work and implement a Kono Fair Trade diamond certification scheme that will assure buyers that they are purchasing legally mined goods for which miners received a fair price. Other likely interventions could see the creation of alternative sales options that enable miners to by-pass the established dealing system, the establishment of a marketing channel involving larger international players, and facilitation of the involvement of commercial banks with a view to eliminating the role of untraceable cash in the purchase of diamonds – all activities which assure GoSL adherence to the Kimberly process. Three intermediate results are to be achieved under this SpO:

IR1: Broadened community-based political participation;

IR2: Promoting civic dialog and informed participation in public affairs and

IR3: Strengthened efficiency of Government and local communities to manage the diamond sector.

Intermediate Result	Indicators
IR1: Broadened community-based political participation	<ol style="list-style-type: none"> 1. Community leaders adopt more consultative approaches. 2. Increased public awareness of political processes and systems. 3. Community leaders more accountable to their people. 4. Increased public oversight of Government activities on selected key issues. 5. Increased number of groups formed.
IR2: Promoting civic dialogue and informed participation in public life.	<ol style="list-style-type: none"> 1. Civic unrests and open confrontations reduced in favor of constructive dialog. 2. Increased participation of women and youth in public dialog and political processes. 3. Increased Airtime devoted to civic education and public information. 4. Rural radio stations established / supported. 5. Increased number of events on targeted issues of public and national interests.
IR3: Strengthening the efficiency of Government and local communities to manage the diamond sector.	<ol style="list-style-type: none"> 1. Number of stakeholders participating in diamond sector reforms. 2. value of legally exported diamonds 3. Number of artisanal diamond mining licenses issued.

In order to achieve the intermediate results and the special objective, USAID will support the following activities:

Broadened community-based political participation: This activity will focus on training/ skills transfer on Good Governance for Civil Society Organizations and civil authority leaders, advocacy skills building, civic training for disenfranchised communities, constituency outreach for Members of Parliament/ Public Officials.

Promoting civic dialogue and informed participation in public life: Support will be provided to rural radio broadcasting outfits and activities that promote dialog on public and national issues including the advocacy and monitoring and the safeguard and protection, of human rights. **USAID** will provide support for the expansion and access to/for private radio and broadcast media nationwide, including public institutional support for policy development (where needed), grants for private radio station development, and training. Support will also be provided to activities aimed at decentralization of public institutions and associated service delivery systems and to the strengthening of the voice and role of civil society in decision-making of local/community affairs.

Strengthening the efficiency of government and local communities to manage the diamond sector: This activity will be concerned with strengthening the policy analysis and the development capacity of the Government of Sierra Leone through support for institutional capacity assessments, short-term training, technical assistance, information technology expansion, and related assistance to the diamond-mining sector. The program will support the implementation of the Kimberly Process and promote local community involvement as a means of tracking diamonds from earth to export. It will also involve the provision of credit to exploited local miners to derive maximum benefit from their diamond winnings.

2.0. COUNTRY AND ENVIRONMENTAL INFORMATION (BASELINE INFORMATION)

Sierra Leone is situated on the West Coast of Africa. It is bounded on the north and north east by Guinea, on the east and southeast by Liberia and on the west and south by the Atlantic Ocean with a coastline stretching 560 km extending from the boundary with Guinea to the north of the mouth of the Great Scarcies river and on to southeast at the mouth of Mano river. The Atlantic coastline is made up of a belt (average width 50 km) of low-lying mangrove swamps, except for the mountainous Sierra Leone Peninsula on which Freetown is situated. The eastern half of the country is mostly mountainous and includes Bintimane Peak, Sierra Leone's loftiest point (1,948 m) located near the Guinea border. Several rivers, including the Great Scarcies (which makes up a section of the boundary with Guinea) and the Mano (which forms part of the border with Liberia), flow through the country to the Atlantic.

Sierra Leone is a tropical country with temperatures averaging 26°C. The climatic variations give rise to different zones of vegetation and crops in the country. The southeast has the longest rainy season (from May to October with a period of heavy rains from July to September) and its vegetation is tropical forest. It is also a region that produces timber, cacao, coffee, kola and oil palm. The northeast is situated in a savannah where the relatively lower rainfall (1,900 to 2,500 mm per year) and the desiccating wind shorten the agricultural season. Peanut and tobacco are cultivated here. Rainfall is very high along the Atlantic coast (5,000 mm in some localities). In the northwest, rice fields are cultivated in the mangrove areas.

Sierra Leone is rich in natural resources such as diamonds, titanium ore, bauxite, iron ore, gold and chromite and has high agricultural potential. The country has a population of 5.2 million and a total land area of 73,326 sq. km which are distributed by type of land use as follows:

- Arable land: 7%
- Permanent crops: 1%
- Permanent pastures: 31%
- Forests and woodland: 28%
- Other: 33%

In 1995, the agricultural sector employed 62% of the active population. Agriculture is mainly extensive and based on a slash-and-burn system with a fallow period from 5 to 10 years. The most important subsistence food crop is rice, followed by cassava.

Rapid population growth, over harvesting of timber, expansion of cattle grazing, slash-and-burn agriculture, and the civil war have resulted in serious environmental degradation, especially the deforestation and the depletion of the natural resource base.

Sierra Leone is party to international agreements on Biodiversity, Climate Change, Desertification, Endangered Species, Law of the Sea, and Marine Life Conservation.

3.0 EVALUATION OF ISSUES WITH RESPECT TO ENVIRONMENTAL IMPACT POTENTIAL

All the foreseeable activities to be carried out under this Special Objective 2 are primarily concerned with the provision of technical assistance, training actions, information transfer, institutional capacity building, and civic education and will not have any direct impact on the environment. A new activity of the SpO – a credit program for diamond miners will necessitate an Environmental Assessment. This credit program is designed to enable disadvantaged and exploited miners to gain a fair share of the markets and sell at competitive prices. Since there are environmental consequences from alluvial diamond mining, particularly when conducted very close to rivers, as expected in this program, an Environmental Assessment will be required. Given the relatively small size of the activity (*illustrative amount removed from this copy*) and the availability of local expertise in diamond mining and environmental issues, the scope of work for the EA will call for a modest, yet comprehensive study conducted by local experts.

4.0 RECOMMENDED THRESHOLD DECISIONS & MITIGATION ACTIONS (INCLUDING MONITORING AND EVALUATION)

All, but one of the, foreseeable activities to be carried out under this Special Objective are primarily concerned with the provision of technical assistance, training actions, information transfer, institutional capacity building and civic education, and are not expected to have any direct impact on the environment. They are, therefore, recommended for **Categorical Exclusion** as per 22 CFR 216.2(2) (i) and (v).

A new activity of the SpO – a credit program for diamond miners – is recommended for a **Positive Determination**, per 22CFR216.3(a)(2)(iii), and an environmental assessment (EA) must be prepared. This credit program is designed

to enable disadvantaged and exploited miners to gain a fair share of the markets and sell at competitive prices. Since there are potentially significant environmental consequences from alluvial diamond mining, an EA will be required. Given the relatively small size of the credit activity (*illustrative amount removed from this copy*) and the availability of local expertise regarding diamond mining and environmental issues, the scope of work for the EA will call for a modest yet comprehensive assessment conducted by local experts. The scope of this assessment must be determined following procedures described in 22CFR216.3(a)(4), and the content of the assessment must follow the requirements of 22CFR216.6. Mitigation actions for the implementation of the credit program for miners will be spelled out in the pending EA.

As required by ADS 204.5.4, the SO team must actively monitor ongoing activities for compliance with approved IEE recommendations, and modify or end activities that are not in compliance. If additional activities not described in this document are added to this program, then amended or new environmental documentation must be prepared. The SO team will also ensure that provisions of the IEE concerning mitigative measures and the conditions specified herein along with the requirement to monitor be incorporated in all contracts, cooperative agreements, grants and sub-grants.

ANNEX 4: EXCERPTS FROM THE 'POVERTY REDUCTION STRATEGY PAPER FOR THE MINERAL RESOURCES SECTOR' PREPARED BY THE MINISTRY OF MINERAL RESOURCES, MARCH, 2004

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Estimates put the number of people employed by the artisanal mining sector at between 200,000 and 300,000. This is a large percentage of the total labour force and could probably be higher than that employed in full time agriculture. When one considers the large number of people employed in the artisanal sector and their dependants, the conclusion can be made that artisanal mining accounts for the sustenance of a preponderantly large percentage of Sierra Leoneans. Artisanal mining operations were started in 1955 with the inception of the Alluvial Diamond Mining Scheme (ADMS). The ADMS was introduced to give an opportunity to the large percentage of people living in mining areas to earn their living from legitimate licensed mining in areas that could not be mined by the large-scale mining companies. Artisanal mining areas have since then been demarcated in over 80 chiefdoms all over the country. Artisanal miners receive their support from various sources. Such support is not only in the form of mining implements but involves in many instances the provision of food to miners and their families and the provision of medicine to miners. Artisanal mining does provide a means of earning a living for many families not directly involved in agriculture. Even for those that may be involved in seasonal agricultural activities, artisanal mining can be carried out in off-season periods. The relationship between sponsors and miners is mostly cordial and revenue from mining activities caters for the welfare of miners and their families.

Miners in the structured large-scale sector are provided benefits by their various companies and most are members of Unions that look after their interest. For artisanal miners, local and social beneficiation have been very poor with very little of the proceeds from mining going to miners and their families. Individual miners would need to gang up into groups or cooperatives if they are to receive any meaningful help in order to benefit significantly from diamonds. Artisanal mining can also be a dangerous and environmental destructive occupation. Working and living conditions at mine sites are often poor. The industry is characterized by limited skills, low capital investment, an absence of infrastructure, minimum reserves and short implementation time. There is need to provide assistance of various sorts to artisanal miners if they are to ever break out of the incessant cycle of poverty.

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6.5.2 Recommendations

1. Institute awareness programmes

There is need to train artisanal miners in the identification and valuation of diamonds, marketing, occupational health and safety practices, business practices and stakeholders' roles.

2. Institute revolving equipment fund

The fund will be used to purchase equipment, which can either be for rental or for hire purchase. NGOs and private companies should be encouraged to participate in such schemes.

3. Create cooperatives to enable easy access to credit

This is the only way artisanal miners can easily access credit

4. Strengthen the Institutional capacity of the MMR for better monitoring

This will apply to better monitoring of mining and marketing activities and technical assistance / training of government personnel and miners.

5. Institute an identification and tagging system for miners

This will help identify illegal miners, thus helping to concentrate on legitimate miners.

6. Reinforce monitoring of permit laws

Permit laws for “Diamond Protection Areas” are already in place. These need reinforcement.

7. Protection of the rights of miners and their personal security issues

This will stop unscrupulous people taking advantage of legitimate miners.

6.6 *Environmental and community development*

6.6.1 Concerns

Communities bear the overwhelming social, cultural, economic and environmental impacts of mining for which there must be indemnity to compensate for the negative effects of these activities. There is often a wide divergence of views between national government and local communities and open conflict over how mining revenue is shared. Local communities get very little direct benefits from mining revenue earned by central government. They are often pitched in direct conflict with mining companies demanding solutions to environmental and development issues. Such circumstances have created a seedbed for several problems including human rights abuses. Although large-scale mining companies are now better regulated by government in the environmental and development spheres, the implementation of these regulations leaves a lot to be desired. Health, environmental and development issues in mining areas are intertwined in these policies and regulations. There is need to ensure that communities benefit from mining operations-whether large scale or artisanal.

6.6.2 Recommendations

1. Create Health Centres

Health centres in mining areas are woefully inadequate. There is need to create more health centres and posts and provide drugs and personnel in mining areas.

2. Institute Health Sensitisation programmes

There is need to increase the awareness of people living in mining communities on important health issues. This includes sensitisation on HIV/AIDS.

3. Support for enforcement and monitoring of environmental programmes and programmes for handling child labour issues

Most of the monitoring and enforcement institutions are ill equipped. Departments like the Environmental Department and the Child Welfare Division of the Ministry of Social Welfare, Gender

and Children's Affairs should receive strong support and encouragement should be given to various programmes sponsored by organisations like the ILO and UNICEF.

4. Enforcement of laws for migration into mining areas

There is often gross overpopulation in mining areas and facilities are inadequate. The lure for precious minerals is great. Laws for migration into mining areas should be enforced.

5. Setting up Trust fund from Government revenue earned from mining companies for community development

Part of the money earned from mining areas in terms of royalties and taxes should be ploughed back into the corresponding mining areas for community Development. This should be legislated.

6. Revisit surface rent payment levels and distribution and compensation payments for crops, houses etc.

The method of distribution of surface rent payments is unfair. Surface rent payment levels and compensation payments for crops, house etc. are grossly unfair.

7. Special Agricultural projects for mining areas

Numerous surveys have indicated a lack of interest in agriculture in mining areas. Special agricultural projects should be targeted towards mining areas.

8. Resolve issue of distribution of Agricultural Development Fund paid by mining companies

Government needs to resolve this issue.

9. Improve dialogue between stakeholders

This can be in the form of workshops.

6.7 *Efficient use of resources for national development*

6.7.1 Concerns

It must be ensured that Sierra Leone derives the maximum benefit from mining activities. Relevant measures must be put in place.

6.7.2 Recommendations

1. Take concrete action on some important issues

Ensuring maximum national benefit from the mining sector would require concrete and determined actions on the various issues highlighted earlier, especially with regard to the legal framework, fiscal regime, institutional strengthening and capacity building. This should contribute to efficient exploitation of the mineral resources and afford the country an optimal take from the proceeds of the industry.

2. Utilise proceeds from mining prudently to support national development

An enlightened policy on the use of the proceeds to support national development should be put in place. Specifically, the proceeds from mining should be channelled to investment in required physical, economic and social infrastructure, such as power, telecommunications and road systems, health and educational facilities, and income-generating assets.

3. Diversify the economy to augment income from mining

An effort should be made at economic diversification so that other sectors are developed to augment the income from the mining sector and provide a revenue base when the mining sector runs out of steam.

4. Add value to raw products

Beneficiation should be given due attention to add value to the raw products, enhance foreign exchange earnings and employment possibilities.

5. Rehabilitate mined out areas

Mined-out areas should be rehabilitated and put to productive use.

6. Address pertinent governance issues

Governance issues should be accorded due weight in national policy to facilitate balanced development, citizen participation, human rights, national cohesion and stability, and prevent diversion of resources through corrupt practices.

The workshop concluded that the issues and recommendations contained in the report should form the basis of a holistic and robust programmes for the Minerals Sector Reform Programme for Sierra Leone.

Implementation of these programmes will go a long way towards satisfying some of the government objectives in respect of poverty alleviation.

7.0 CROSS CUTTING ISSUES

Mining activities have a bearing on several peripheral issues that would need to be tackled if the social and economic benefits sought from mining are to be meaningfully realised. These issues apply to small scale and artisanal mining and also large scale mining. The lure for precious minerals like diamonds in a depressed economy like Sierra Leone's could be beneficial but does create several problems especially in the artisanal mining sub sector. The cross cutting issues include those dealing with health and the environment, women, children and HIV/AIDS.

Mining, environment and community development

Many resources can be mined far more efficiently and intensively using large scale mining methods and in terms of environmental damage, small scale mining generally has a greater impact per unit of output. From a livelihood perspective artisanal and small scale mining (ASM) often provides the only source of income and is therefore important. ASM activities are likely to disappear naturally if progress towards sustainable development is made since alternative more attractive employment options will become available.

Artisanal mining can be a dangerous and environmentally destructive occupation. Working and living conditions at mine sites are often poor. The presence of these problems is hardly surprising as they are inherent in artisanal mining which can be described as all non mechanized, low output extraction of minerals carried out by individuals and small groups, frequently on intermittent basis, and employing essentially traditional manual techniques. The industry is characterized by limited skills, low capital investment, an absence of infrastructure, minimum reserves and short implementation time.

Communities bear the overwhelming social, cultural, economic and environmental impacts of mining for which there must be indemnity to compensate for the negative effects of these activities. There is often no consensus on what reasonable expectations should be in relation to the mitigation of adverse economic and social impacts, local economic and social development around the minerals project or in assuring that these benefits can be sustained post mining.

Although large-scale mining companies are now better regulated by government in the environmental and development spheres, the implementation of these regulations leaves a lot to be desired. They are required by the mining agreements with the government to meet certain local community obligations. A company would normally prepare a sustainable development plan for its areas of operation which would cover health, agriculture, educational and other aspects of the social life of the indigenous populace. Health, environmental and development issues in mining areas are intertwined in these policies and regulations. The Mines and Minerals Act of 1994 states thus:

“In deciding whether or not to grant a mineral right, the Minister of Mines shall take into account the need to conserve the natural resources in or the land over which the mineral right is sought or in the neighbourhood land. The Minister shall require environmental impact assessments as prescribed as a condition for granting a mining lease except in the case of leases for building and industrial minerals”.

The Government has also passed an Environmental Protection Act in Parliament. This addresses administrative matters and the institutional machinery to handle environmental issues. The policy requires all medium scale and large-scale companies to prepare Environmental Impact Assessments (EIAs) and obtain an environmental license before the start of mining.

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Case study-Environment Impact Assessment for a mining area:

An example is provided below of an Environmental Impact Assessment study done for a major mining company in the Kono District to illustrate the multifarious social and environmental problems caused in mining areas.

CASE STUDY

Water and water quality

Wells are the main source of drinking water. Nearly all the wells are of the unimproved traditional type and are located at distances of 0 to 1500m from households. About 60% of the wells are perennial while 40% are seasonal. The dominant uses of water are cooking, laundry, bathing, and drinking. Wells in the project area are shallow (mean total depth is 4.35m and mean depth to water surface is 3.14m).

Results of the survey indicate that all selected water sources have pH values within the limits of 6.5 to 8.5 as recommended by the WHO. The local wells sampled were within WHO standards for electrical conductivity, residual chlorine, and concentrations of dissolved chemicals (fluoride ion, iron, manganese, nitrate nitrogen). Turbidity values for well waters sampled were also well within the maximum threshold values recommended by the WHO. There were however some high results for some stream samples for turbidity and some dissolved chemicals, making them unsuitable for drinking. Faecal-indicator bacteria were discovered in all the water sources in different proportions. These are indicative of faecal contamination. It is therefore not safe to take drinking water from these sources for now. Protection/dewatering and chlorination of these sources is necessary for the provision of potable water.

Soils and landuse

The scale of mining and other land use activities in the project area has led to serious land degradation through loss of vegetation cover resulting in bare ground, soil erosion and the creation of stagnant water bodies which become breeding grounds for parasites, etc.

The soils range in depth, from shallow on the hill crests to deep and very deep on the low dissected upland, side slopes and inland valleys swamps. The textures are mainly, sandy loams, coarse sandy clay loams in the topsoils, overlying coarse sandy clays mixed with saprolite. The soils are generally desaturated in all the important nutrients, with strong to extremely acid soils due to excessive leaching and erosion, which have been accelerated by the exposing of the soil surface during mining activities. The fertility status can be described as low. The soil surface is extensively scarred with heaps of tailings and Kimberlite rocks dumped all over the area.

Agricultural activity is virtually non-existent within the project area and less than 5% of the project area is being farmed. The only type of agriculture practiced in the surrounding settlements is backyard gardening. Agricultural activities are characterised by traditional practices, no improved varieties, lack of fertiliser use, and no extension services. The farming system is still based on shifting cultivation on the uplands. On these uplands, rice is grown in mixed stands with other arable crops. Most of the swamps cultivated, are those, which had been previously mined and abandoned. It appears that since the previous phase of the study, the swamps had regenerated some amount of soil nutrients to make the growth of root crops and even rice possible. In the swamps, rice is the main crop followed by root crops and vegetables. Fallow periods range from 7-20 year depending on the size of the farm holding. The farm sizes are generally small (0.2-0.8 hectares) rarely 2 hectares.

Extensive mining and limited agricultural activities have resulted in the destruction of the environment with undue exposure of the arable fields to the vagaries of the weather, resulting in low agricultural output. However, the density of the forest at Monkey Hill is much improved over 1996 when clearing and logging for agricultural and fuel wood uses were permitted. Presently, any use of this vegetation at Monkey Hill is prohibited by traditional law, helping to preserve the forest.

The suitability of the different landforms was tested for a variety of crops including coffee, maize, rice, potato, etc. Results in most cases indicate moderate to marginal suitability for these crops with limitations due to shallow soils, low fertility, rocks, stones, and steep slopes.

The major land use in the project area is surface mining. Other land uses such as grazing, tourism, hunting, fuel wood collection, arts and crafts are almost non-existent. This is because the area is now devoid of all forestry except the small patches of secondary forests and forest regrowth found in the Monkey Hill ranges.

There is hardly any livestock in the project area at the present moment. Most of the residents complained of having lost all their sheep, goats, and poultry during the rebel attacks.

The area does not have tourist attractions. In fact, the landscape could be an eyesore to any visitor not interested in diamond mining and who is concerned about the environment. Recreational facilities are non-existent within the project area.

Socio economic and socio cultural aspects

Houses are poorly constructed with only a few houses built with concrete blocks and roofed with corrugated iron sheets. Most of the houses at Sokogbe, Swarray Town, and Manjanadu are built with mud blocks or just mud and bush stick frames. About 70% of the houses were destroyed or burnt down during the war. Though a few have been rebuilt, there is a dire need for reconstruction on a large scale. The total population in the settlement area is estimated at 2,934 inhabitants (down from 5,500 in 1996). Nine hundred and fifty-five houses in the lease area are either partially or completely damaged/burnt as a result of the war. The mean size of persons per household has also dropped from 27 persons in 1996 to 6.7 persons in 2003. Forty percent of the population is below 14 years of age. Konos constitute 71% of the population; there are other ethnic groups who have migrated to the area mainly for economic reasons.

Educational provisions are inadequate, resulting in high illiteracy rates. Other indicators of sub-standard living conditions are high levels of unemployment, poor housing and poor health facilities. The entire area has only four primary schools, one technical vocational training centre for blacksmiths and no secondary school.

Health facilities are almost non-existent within the lease area. Most of the residents depend on the Government health centre in Koidu Town. Those who cannot afford to use this facility or the limited ones provided by pharmacies, dispensaries, or other health centres in Koidu resort to consulting local medicine men or quack doctors.

Environmental sanitation is poor. More than 90% of the toilets are traditional pit latrines. These latrines are mostly uncovered and not properly cared for. Most of the latrines are boreholes surrounded with old corroded iron sheets with no doors. The nearby bushes and streams are also used as toilets. There are no organised and protected refuse disposal sites. The bulk of the household refuse is disposed of at random, on the roads, behind the dwelling homes and in the streams and old diamond pits. The health risk engendered by these practices is immense.

When interviewed, members of the population indicated a wide spectrum of occupational and economic activities (including mining, farming, and trading). Although only 4.8% claimed to be miners, it was clear from subsequent investigations that almost all of the adult population, including most teenagers, have been involved in mining at one time or the other. Nevertheless, it is apparent that the benefits of diamond exploitation in the area are not manifested in the living standards of the residents.

Farmers cultivate plots mostly around their houses and in swamps very close to the settlements. Vegetable production takes place largely in backyard gardens, in the vicinity of the houses and in swamps during the dry season. It was reported by most farmers that cultivated land areas are rapidly decreasing and impoverished as a result of the mined-out pits. There is a general lack of inputs such as tools, fertilisers, chemicals etc.

Access to credit either for farming, mining or business is very limited in the settlement. No respondent reported accessing credit of any type since their return and resettlement. Financial institutions such as banks and cooperatives, which usually give credit/loans for such activities, are yet to be revitalised in the district.

Availability of planting materials, especially improved ones, also poses problems for farmers in the study area. This, coupled with the limited use of fertilisers, pesticides and herbicides, has increased the vulnerability of household members to food insecurity. According to the 2001 crop figures (National Recovery Strategy, Sierra Leone 2002-2003) Kono district was ranked as the most vulnerable in the country, producing a mere 21% of its cereal requirements, and had the third highest number of vulnerable farm families (37,000).

Social and economic amenities such as markets, community centres, court barriers, sporting amenities, and places of entertainment are woefully lacking in the lease area. All these amenities are concentrated in Koidu.

A significantly large number of respondents displayed a low level of knowledge about HIV/AIDS. Questions were mainly related to methods of transmission and prevention.

A significant number of the respondents also had discriminatory attitudes towards HIV/AIDS afflicted people. There was a general lack of awareness on how to access HIV testing facilities.

Youth groups have been particularly active and vocal in the Kono District. Most of these groups comprise indigenous Kono people who are very critical of the perceived negative role played by Traditional Authorities and the Government in the development of the Kono District. Although the influence of the youths may wane as civil authority gradually returns to the District, they will nevertheless remain a force to reckon with.

Kono District had an estimated 3,627 registered ex-combatants (National Recovery Strategy, Sierra Leone 2002-2003). Out of this, only 29% have been provided with reintegration opportunities. The District is reported to have suffered the second highest level of displacement during the war of all the districts in the country. About 54,500 people were formally recognised as being displaced during the war (over 15% of the population). This is corroborated by this study which shows that almost all of the respondents and their families were displaced at one time or another during the course of the ten-year old war.

Status of infrastructure and damages caused by artisanal mining

Major trunk roads in the area have been damaged over the years. There has been an absence of any road repair programmes. Feeder roads present are mainly mine access roads. Most are in a state of disrepair and some have been subjected to the vagaries of artisanal mining.

Communications facilities are severely limited. There are however plans to extend two of the mobile phone networks to the District. Electricity supply and water supply services with pipe borne water are woefully lacking.

Unbridled artisanal mining over the years has resulted in severe scarring of the land surface at several locations which have been well documented.

As can be seen from the case study, the social and environmental problems caused in mining areas are significant. The positive note is that the Environmental Management Plan is designed to mitigate the negative effects listed above. Stringent monitoring is required to ensure that mining contributes positives to the social and environmental life in the affected areas.

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PROGRAMME OF INTERVENTION MEASURES

(measures listed are only those applicable to artisanal mining)

AREA	ACTIVITIES	KEY PERFORMANCE INDICATORS	COST (OVER 3 YEAR PERIOD)- US\$
Benefits to artisanal miners	<ul style="list-style-type: none"> • Institute awareness programmes. • Institute revolving equipment fund. • Identification and tagging system for miners. • Reinforcement of permit laws. • Initiate social pilot plan for selected artisanal communities. 	<ul style="list-style-type: none"> • Improvement in wages and condition of miners. • Increase in production from artisanal miners. 	3,000,000
Environmental and Community Development	<ul style="list-style-type: none"> • Institute health sensitization programmes. • Support for monitoring of environmental and child labour issues. • Set up trust fund for Community Development. • Improvement of dialogue between stakeholders. 	<ul style="list-style-type: none"> • Cross sectoral coordination of social and management issues in sector. • Days required to process environmental applications. • Reduction in number of disputes between mining companies and communities. 	1,000,000
Efficient use of resources for national development.	<ul style="list-style-type: none"> • Rehabilitation of mined out areas. 	<ul style="list-style-type: none"> • Extent of areas rehabilitated. 	1,000,000
Encouragement of mining in small-scale and artisanal mining sector.	<ul style="list-style-type: none"> • Initiate satellite imagery work. • Initiate pilot extension services and train field staff. • Prepare database of mineral rights. • Install cadastre system. 	<ul style="list-style-type: none"> • Increase in production from artisanal mining. • Increase in export value of diamonds. 	600,000

ANNEX 5: TYPICAL ENVIRONMENTAL IMPACTS OF MINERAL EXTRACTION ACTIVITIES

TYPICAL IMPACTS FROM MINING

Impacts are not always negative, they can also be positive.

- Temporary access roads/tracks,
- Pits for biodegradable camp waste; pit latrines; water reservoirs,
- Use of existing scarce water supplies,
- Destruction of local vegetation,
- Change in natural environment and competition with local community for wood and water,
- Linear scars in the vegetation pattern. Open cut lines can serve as access routes for game, livestock and local population,
- Disruption of soil profile, loss of topsoil and seedbed ecosystem,
- Linear excavations may cause channeling of erosion, while open trenches and pits are dangerous for game and stock, and trapping fauna in general,
- Leveling of areas for plant and facilities causing disruption of soil profile, loss of topsoil and seedbed ecosystem,
- Local communities/landowners may be left with some facilities and/or new water supply points. New settlements could develop around new water supply points,
- Rehabilitation cleans up and remediates pollution, reduces impacts and/or visible impacts, and returns area as close as possible to its original condition where it is feasible to do so,
- Residual impacts may be bush encroachment of invader species re-vegetating cleared areas faster than other species in the area,
- Local community may lose source of income and support,
- Squatter community establishes itself; interaction/disturbance/conflict with farm employees and/or local community,
- Employment opportunities for local community and support of local businesses,
- Habitat loss over large area by clearing, grading and leveling,
- Loss of topsoil and seedbed ecosystem: Change in land use from wilderness to mining operations: Landscape modification. Heavy vehicle traffic and waste rock accumulation,

- Acquired make staff more marketable after mine closure,
- Lowering of water table: Effect on flora and fauna, and other water resource users. Pollution by mine water containing metals and/or chemicals. Generation of scrap, e.g. pipes,
- Build up of tailings dumps on surface: Landscape modification and habitat destruction. Until the tailings have compacted and the water has been expelled, they remain very fluid. Danger of failure of tailings dam walls resulting in mud slides, endangering people working or living down gradient. Water loss, dust, oxidation of sulphides and formation of ferric oxide, leaching of oxidation products by rainfall and seepage into and pollution of surface and/or underground water system, deposition of red ferric oxide downstream of tailings dams. Toxicity and visual pollution,
- Useful utilization of mining infrastructure after mine closure,
- Rendered safe and immediate and long-term negative environmental impacts reduced and visual pollution decreased,
- Detects pollution that was not obvious during rehabilitation and/or that develops after mine closure.

COMMON MITIGATION MEASURES

- Make cut lines only where essential and keep clearing to a minimum: Cut just enough branches to provide clear line of site, avoid cutting whole trees and shrubs, cut the narrowest possible line in densely vegetated areas, if possible cut only the baseline for vehicle access, where possible use existing tracks as the baseline. Sampling, drilling and trial mining.
- Refill trenches and pits, for procedures for excavation, preservation and final replacement of topsoil when trenches and pits are rehabilitated.

MITIGATIONS

- In general, facilitate removal by relevant institutions of archaeological artifacts, fossils, flora, and fauna that will be impacted by mining. Fence off vulnerable sites, e.g. rock art. Strict site supervision, regular inspections and training need to be exercised in order to limit negative impacts. Preparation for construction and mining/processing.
- Providing buffer area between mining and farming activities to reduce the likelihood of conflict with the farming community.
- Remove and store topsoil, however assess each situation separately, obtaining recommendations from specialist as necessary. Select borrow pit sites with the lowest impact on the environment should be selected and sensitive areas avoided; try to locate construction materials borrow pits in overburden over ore body or where they will cause the least visual impact.
- Remove and store topsoil. Design for safety, appropriate volumes, rain, storms, acid drainage, drill curtain of boreholes to monitor pollution of ground water.
- Construct adequate amenities and facilities to meet the needs of a healthy community; construct facilities for sorting and recycling of waste leave space for and encourage the development of local businesses.
- During digging of any form of excavation, leveling or any other activity that involves disturbing or removing the topsoil, the vegetation cover must be cleared first and stored temporarily, then the top soil with its seed bed, its overlying pebble armour and its contained pebbles is removed next and stored in flattish, low piles with low-angle slopes. Then the underlying rock is excavated and stored

separately from the stored topsoil. The low-angle slopes of the pile will slow down the downward seepage of nutrients during run off of absorbed rainwater. Cover the stored topsoil with the dead, cleared vegetation as protection from the heat of the sun, to preserve the contained seeds from baking. This will facilitate the restoration of the topsoil ecosystem with the all-important organisms that live in and aerate the topsoil so it is able to absorb moisture yet retain its porosity, and encourage immediate vegetation of the stored topsoil. Remove the topsoil only in stages as mining progresses. Infilling and rehabilitation of any excavations takes place in the reverse order. If no dead vegetation available, cover the topsoil to protect it from baking by the sun and erosion, e.g. with gravel, hessian, etc. Carry out re-vegetation experiments, but do not use non-indigenous flora. In certain situations topsoil removal may not be necessary, e.g. beach mining or practical, e.g. gravel terraces.

- Dust suppression, e.g. watering; sequential blasting to reduce charge, vibrations and amount of flyrock. Procedure to be in place to clean up pollution.
- Prepare contingency plans, appoint rescue teams, train staff in the handling of emergencies and hold emergency exercises; hold briefing sessions; provide Health and Safety and Environment awareness information regularly; give refresher courses; place large, clear, easily understandable, cartoon-style health and safety notices in camp and at the plant. Enforce compliance with health and safety requirements.
- Promote AIDS awareness.
- Discuss with landowner/community/government/companies what buildings, after rendering rest of mine area safe, should be left for the long-term use of others, for other purposes and what could/should be done with anything else on the mine no longer required by the company. This should include any building that may be of historical interest.
- Ensure evaporation pans do not encroach onto existing wetlands and lagoon areas.
- Diving supported mining: Removal/pumping of diamondiferous gravels with suction hoses from the surf and shallow sub tidal zones to the nearby shore-based processing plant. Some operations use blowers to first 'blow' away the cover of finer sands to expose the gravels.

ANNEX 6: SIERRA LEONE DIAMOND EXPORT DATA

Table 11. 2004 Sierra Leone Diamond Export Data

Alluvial Month	Kimberlite						Total		
	Export Amount \$	Carats	Price/ Carat	% total production (carats)	Export Amount \$	Carats	Price/ Carat	% total production (carats)	Export Amount \$
Jan-04	\$6,723,552	55,347	\$121.48	100.00%				0.00%	6,723,552
Feb-04	\$7,955,638	57,084	\$139.37	84.96%	\$2,001,077	10,109	\$197.95	15.04%	9,956,715
Mar-04	\$9,972,298	51,666	\$192.05	83.70%	\$2,264,352	10,064	\$225.00	16.30%	12,186,651
Apr-04	\$12,219,748	72,589	\$168.34	100.00%				0.00%	12,219,748
May-04	\$9,824,063	49,713	\$197.62	100.00%				0.00%	9,824,063
Jun-04	\$14,539,283	76,352	\$190.42	85.25%	\$2,832,691	13,208	\$214.47	14.75%	17,371,974
Jul-04	\$11,607,598	51,550	\$225.17	87.09%	\$1,317,575	7,644	\$172.37	12.91%	12,925,172
Aug-04	\$8,358,616	43,623	\$191.61	86.95%	\$1,331,245	6,549	\$203.27	13.05%	9,689,861
Sep-04	\$8,472,239	40,725	\$208.04	78.65%	\$1,425,496	11,057	\$128.93	21.35%	9,897,734
Oct-04	\$8,524,331	36,932	\$230.81	80.26%	\$1,064,521	9,083	\$117.20	19.74%	9,588,852
Nov-04	\$7,593,267	39,965	\$190.00	77.89%	\$1,622,633	11,345	\$143.03	22.11%	9,215,901
Dec-04	\$7,052,411	37,152	\$189.82	100.00%					7,052,411
Total	\$112,793,045	612,699	\$184.09	88.57%	\$13,859,589	79,058	\$175.31	11.43%	\$126,652,634
									691,757

Figures: GGDO

3% of the export amount is the tax to the government; half of this amount goes to the MMR for operation and monitoring responsibilities. 25% of this total (0.75% of exports) goes to the general budget with the remaining 25% (0.75% of exports) going to the DCAF

ANNEX 7: LIST OF KEY CONTACTS

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Network Movement for Justice and Development	www.nmjd.org
Peace Diamond Alliance	www.peacediamonds.org
Africa Diamond Holdings	www.africadiamond.com
Diamond Fields International	www.diamondfields.com
DiamondWorks	www.diamondworks.com
Mano River Resources	www.manoriver.com

ANNEX 9: MEETING DIARY AND WORKSHOP ATTENDANCE

MEETING DIARY – DATE OF INITIAL MEETING

(subsequent meetings not noted)

Date	Organizations Met
January 4, 2005	USAID, Most of Freetown shutdown by strike
January 5, 2005	USAID Mission Director and staff, Peace Diamond Alliance Program, Ministry of Minerals Management
January 6, 2005	DFID, Director of Environment, Ministry of Lands, Country Planning and the Environment
January 7, 2005	United Mine Union, National Accountability Group
January 10, 2005	SL Geologic Service, World Vision
January 12, 2005	Paramount Chief in Kono, Peace Diamond Alliance Field Office, Diamond Broker Prince Sawaka, Kono District Council Director,
January 13, 2005	Government Mining Engineer-Kono, Koidu Holdings, Mining Site Areas
January 14, 2005	Engineer Tamba Matia, Chairman of Council of Paramount Chiefs, MoCKY
January 18, 2005	Conservation Society of Sierra Leone, Global Witness
January 19, 2005	Consultation Workshop (see list below)
January 20, 2005	DFID Advisor to MMR, Environmental Foundation for Africa, One Sky – Canada
January 26, 2005	PDA Tongo Field Office, Tongo Field Women's Groups, MMR Tongo Area, Merlin sponsored Tongo Field primary care health center, essentially a Town Meeting with some 80-100 persons in attendance, representatives from the lower Bombara Chiefdom
January 27, 2005	Focus Group for MMO, MW, and Chiefdom Mining Committees (see list below)
January 28, 2005	Workshop for PDA Executive Committee member orgs plus cooperative representatives (see list below)
February 1, 2005	USAID Country Rep for SL
February 2, 2005	Workshop on preliminary findings (see list below)
February 3, 2005	Care International

CONSULTATION WORKSHOP ON SMALL-SCALE MINING IN SIERRA LEONE JANUARY 19, 2005

Name	Organization	E-mail
Maurice Saccoh	Share Programme Manager	
Christian Lawrence	CGG	
J. Ketelaar	DFID	
Bob Fofana	Geological Survey	
Femi I. Kamaa	MMR	
Abass Kamara	NMJD	
Ibrahim Conteh	U.M.U	
Edward P. Bendu	Environment Protection Dept.	
John Kanu	Policy Coordinator, PDA- DIPAM	

Name	Organization	E-mail
Alimamy B. Kemoh	Talking Drum Studio	
D.M. Kamara	Ministry Local Govt.	
Tiangay Gondoe	CRS	
Adrian Alvarez	CRS	
Hon. T.E. Kaingbanja	Parliament	
Hon. Komba Koedoyoma	Parliament	
Lansana K. Bongay	Human Rights Committee on Arms	
Saa Mattias Bendu	MOCKY	
Several staff	CEMMATS GROUP LTD.	

**KONO DISTRICT FOCUS GROUP ON SMALL-SCALE MINING IN SIERRA LEONE
JANUARY 27, 2005**

Name	Organization	Address	Telephone and email
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Kai F. Mbayoh		87 Yardu Road	
Sahr Sheku			
Michael Quee			
Sahr Frank			
Marcus Quee			
Aiah D. Korbia	Gbense Mining committee		
Sahr Sundu			
Tamba Foa			
Aiah Mambu			
Abu Mbayoh			
Mohamed Sheriff			
Aiah Sam			
Tamba p. Korbia			
Rgt.PC. E.T.T Nyandebo	Paramount Chief of Tankoro C/Dom	Administrative Office, New Sembehun	
J.P. Koroma	MMR-Kono Division		
Joseph S. Kabia			
David Sheku			
Tamba B. Gbenda	MOCKY		
Sahr James			
Mohamed s. Rogers	M.M.R		
Eleanor M. Seasy	"		
Sam A. Demby	MMO		
Sahr Nyaama	DIPAM/MSI	Turner Street Koidu Town	076-603-811

**STAKEHOLDER'S WORKSHOP ON SMALL-SCALE MINING IN SIERRA LEONE, KONO DISTRICT
JANUARY 28, 2005**

Name	Organization	Address	Telephone/email
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S.A. Mbayo	K.N.S.T.C	"	076-766-636
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N.Mani	P.D.A	5 Gbongbor Street	076-759-980
F. Mayeh	"	K.D.E.C. Sch. Mbaoma	076-754-874
F.J.S. Pessima	Adagmak	47 Suku Tamba Street Koidu	076-768-943
P.O.T.Sorboeh	KHL	Koidu Holdings Koidu	076-703-460
Dr. Kpeteqma PDA	PDA		076-770-718
P.C.A.M. Ngekia	PDA	Kamara Chiefdom	076-627-365
P.C.Sykmbloma	Council of Paramount Chief	Tiama Chiefdom	076-674-038
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Charles K. Mboya	Forps	Koidu Town	076-713-243 076-703170
Tamba Allieu	District Council	D.O Barracks	076-602-117
John Esse	P.C.	P.C. Compound, Koidu	076-764-766
P.C Kaimachande			
Kumba Fillie	K.W. A	T.N.A	076-713-246

**PEA DRAFT STAKEHOLDERS DISCUSSION WORKSHOP ON ARTISANAL DIAMOND MINING
FREETOWN, FEBRUARY 2, 2005**

Name	Organization	Address	Telephone/email
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Sam Koroma	DFID DSP"	8 Wesley Street	076-675-986
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Abdulai Jalloh	USAID	U.S. Embassy	076-708-150
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Charles K. Mboya	Forps	18 John Kellei Street Tankoro, Koidu Town	076-713-243 076-703170
Tamba Allieu	District Council	D.O Barracks	076-602-117
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Hon. T.E. Kaingbanya	Parliament	Parliament	
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Name	Organization	Address	Telephone/email
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ANNEX 10: MINING CADASTRE SYSTEM

MINING CADASTRE AND CONTROL OF PRODUCTION AND SALES SYSTEM DATABASE REQUIREMENTS

UNDP in association with the World Bank is working with MMR to introduce GIS and automated tracking of licensed mineral exploration and extraction activities, including those of artisanal diamond mining. The cadastre system being developed would allow for the real-time tracking of mining plots and leases including the generation of maps necessary to support their oversight. The system is currently being designed and piloted with the proposed database requirements contained below.

Table 12. Mining Cadastre and Control of Production and Sales System Database Requirements

	Artisanal/ Small-Scale Mining	Non- Exclusive Prospecting License	Exclusive Prospecting License	Exploration License	Mining Lease	Radioactive Minerals
New application	√	√	√	√	√	√
Application for renewal	√	√	√	√	√	
Grant	√	√	√	√	√	√
Record of payments	√	√	√	√	√	
Notice of discovery	√	√		√	√	√
Monthly mineral production return	√				√	
Precious minerals sales card	√					
Notice of commencement of advanced exploration				√		
Six month report	√			√		
Annual report			√	√	√	
Application for transfer/assignment				√	√	
Approval of a transfer / assignment				√	√	
Notice of suspension / cancellation	√	√	√	√	√	√

The designers envisage that the mining cadastre system will cover all the transactions that take place during the life cycle of the mining title from the initial application, through the granting of the license, payment of fees, tracking of the reports established in the regulation, and final relinquishment of the title.

ANNEX 11: FULL COOPERATIVE PROPOSAL RECEIVED 2-1-05

KOMAFENEH MINING COOPERATIVE SOCIETY MINING PROJECT PLAN OF WORK AND BUDGET- 2005 FOR ONE MINING ACRE							
NO.	ITEM	UNIT	QUANTITY	NO. OF PEOPLE	DAYS	UNIT COST (Le)	TOTAL COST (Le)
(I)	PERSONNEL AND THEIR SUPPORT:						10,800,000.00
(II)	TOOLS AND EQUIPMENT:						11,615,000.00
(III)	PROJECT SUPPLIES:						2,580,000.00
(IV)	CONSTRUCTION:						793,000.00
(V)	MISCELLANEOUS:						3,000,000.00
	Grand Total						28,788,000.00

Note:

Assuming value of winnings from mining	=	Le100,000,000		\$35,714.29
Payment of Loan to Donor	=	28,068,000		
	=	71,932,000		
10% of 71,932,000	=	7,193,200 to saving account.		
Balance	=	64,738,800		
5% Of 64,738,800	=	3,236,940 to Com. Development		
Balance	=	61,501,860		
Total Share	=	184		
61,501,860 / 184	=	334,249 multiply by the number of shares belonging to each member.		

Name of Cooperative: Komafeneh Mining Cooperative Society

Mission Statement: Free and equal co-existence through diverse cooperative transparent and accountable economic activities to enhance the promotion of the Socio-Economic development and sound environmental practices in our community.

Resource Summary:

1. Land - A legally acquired Mining plot (plot- 26) at Farandu for the period between December 2004 and November 30th 2005 in the first instance and subjected to renewal for future use if need be.

2. Expertise – A good number of the membership are Veteran miners, some with over 20 years of experience in the artisanal mining field. Some members have gone through training at the PDA and for which they have been certified. Some members also have gone through trainings involving bookkeeping, accounting and Small Scale business management.

3. Cash – The group can presently boast of two hundred and twenty five thousand Leones (Le225, 000.00) as cash at hand and this is in our account at the Rokel Commercial Bank – Koidu Branch – Account No. 7183603.

4. Tools – The cooperative is in present possession of the following working tools:

- (i) 12 Shovels
- (ii) 6 Pick-axes
- (iii) 15 Buckets

5. Other support – The cooperative mainly depends on member contribution for the running of cooperative affairs. This is done through: monthly contribution, fines from members, shares, registration fees and personal sacrifices.

Business Concept: As a cooperative organization we have come to bring resources together in order to achieve maximum and sustainable benefit in our business undertakings while the risk, which is an integral part of any business will be shared by a large group of people and not affecting any single person or small group adversely. However we are not oblivious of the possible social and environmental consequences such undertakings may have on the community at large, hence the reason why we hope to compensate in the form of undertaking developmental projects and environmental rehabilitations as stated in our work plan.

Goals and Objectives:

- To foster unity and cooperation among all members of the cooperative.
- To rehabilitate and develop the land after mining through collective participation and collaboration for alternative uses in the future.
- To educate members of their roles, responsibility and civic right.
- Promote and sustain skills training and micro enterprises for self-reliance and economic development.
- Females to be granted equal opportunity to hold executive position and contribute in decision-making.
- Grant equal socio-political opportunity to the female folk.
- Encourage sustainable environmental practices.

Financial Plan and Budget:

A. Controls:

As a registered group with the Government of Sierra Leone, all members are bounded to uphold the Codes and Conducts stated in our Bylaws.

All expenditures will be supported by receipts.

No withdrawal will be made without the approval of the general membership.

Three persons are the signatories to the bank account.

There will be on the spot valuation of winnings preferably by a local valuer.

No individual will be allowed to handle diamonds in his or her private possession for more than the time taken to move the diamonds from the washing site to the bank.

B. Accountability:

Monthly financial report to the general membership and quarterly report to the Donors.

All books are always open for inspection by both donor and the members including PDA.

The books will be open to both internal and external auditors.

There will be a logbook for the recording of all daily events including purchases and winnings.

A PDA officer will be stationed at the site and oversee all activities of the cooperative at site and after.

Resource Requirements:

Hiring of machines through membership contribution. Human resources are provided by the members. Land acquired and licensed by members buying shares. The same contributions were used to buy tools to start our pilot mining.

Risks and Rewards: -

- Funding the project
- Getting winnings after mining
- Politic and leadership e.g. chiefs, political leaders.
- Donor support / late funding etc.
- Better winnings
- Sustainability of the cooperative
- Better living standard for members.
- Progress and development in the community.

Key Issues:

1. Increase in license fees.
2. Better funding
3. Early funding
4. Lack of machines e.g. caterpillar, pump machines etc.

ADDITIONAL INFORMATION: Proposed 90-day mining cycle, propose to pay 2000 Leones per digger per day

ANNEX 12: TYPICAL FIANCIAL ASSURANCE REQUIREMENTS FOR THE MINING INDUSTRY

Financial assurances should cover the full spectrum of mining costs, reclamation, and cleanup. (Including both short-term and long-term environmental impacts.)

All forms of financial assurances must be liquid.

Financial assurances should be readily accessible, dedicated, and releasable only with the specific assent of the regulatory authorities, and after all environmental requirements have been met.

Any release of financial bonds must be preceded by a public notice, with opportunity for comment or objection.

Financial guarantors must be financially healthy, and any form of risk pooling must be operated on an actuarially sound basis.

The public should have input into decisions about adequate bond levels and bond release.

ANNEX 13: MALARIA AND INFRASTRUCTURE DEVELOPMENT

Following is a discussion of the kinds of environmental control methods that have been proven successful in reducing malaria vector breeding and the related incidence of malaria in effected populations. This information may be useful in establishing operating guidelines for these kinds of infrastructure. However, it is essentially that the local species of malaria vector and other local conditions be well understood before adopting a specific reduction process. Note that some species of mosquitoes have opposite reactions to management controls.

IMPOUNDMENTS

Impoundments refer to the reservoirs of water stored behind dams. Some of these impoundments may serve needs for hydroelectric power generation, agricultural irrigation or livestock management, or potable water for people. After a dam is constructed, mosquito populations in the area generally fall, particularly if the action combines a number of small water bodies into one large area of water as the reservoir fills. Any mosquito larvae that might occur within a dam area are usually confined to the shoreline. This is particularly true if there are fishes stocked in the reservoir, since many fishes are rapacious predators of mosquito larvae. Only when there is floating vegetation shielding the aquatic stages of mosquitoes will vector populations expand.

There are a number of ways for reducing the threat of malaria from dams that relate to their design and operation. Reservoirs should not be sited in areas of shallow water. Not only will this lead to increased water loss through evapotranspiration, but it may also provide ideal breeding sites for mosquitoes. During the construction of impoundments, vegetation should be cleared around the water edges, particularly between high and low watermarks. Pools along the margins of the impoundment should be drained wherever possible. Bank stabilization efforts should be taken to prevent erosion and vegetation growth along the shoreline. Such vegetation and the presence of driftwood give way to new breeding sites. Low flow zones in water channels need to be reduced to prevent water stagnating and providing breeding habitats for mosquitoes. Seepage from the base of a dam can also be a problem, wasting water and providing persistent pools of water for the propagation of mosquitoes. Off-takes, of greater diameter than normal, will allow the water level in the reservoir to drop rapidly allowing many mosquito larvae around the edge of the reservoir to be stranded and killed, providing there is no pooling. Moreover, the rapid run off can be used for flushing mosquitoes out of irrigation channels.

CANAL LINING

Lining irrigation canals with concrete makes good sense, not just to reduce seepage and thus save water, but also to reduce the risk of creating mosquito-breeding sites. Lining will increase water flow, washing the aquatic stages of mosquitoes out from canal networks. If they are well maintained, plants will not become established to offer shelter for some species of mosquitoes. Since there is less seepage with lined canals this results in less need for drainage, which may also reduce mosquito breeding. In cases where vector mosquitoes become established in the canals it makes it easier to control mosquitoes either by water management or by targeted use of insecticides. People and domestic cattle should be prevented from crossing canals or drainage channels in order to prevent the formation of hoof or foot prints that can make ideal breeding habitats for some mosquitoes. Construction of bridges or placing large stones or rocks in such areas may also help alleviate the problem.

FILLING

Abandoned ditches, borrow pits, and ponds should be filled to remove potential mosquito breeding sites. These are particularly important if situated close to human habitation. Unfortunately, because anophelines much prefer clean water areas to polluted areas, one response that has been widely used is to contaminate water bodies with refuse to intentionally pollute the water. More reasoned options should be explored.

DRAINAGE

A well-constructed drainage system can prevent the formation of small water bodies that support the breeding of mosquitoes. Straightening of streams and the removal of vegetation from banks can reduce mosquitoes by washing the aquatic stages away and allowing larvivorous fish access to the adult mosquitoes. Surface-drainage requires improving watercourses and the construction of ditches. In all cases these need to be built following the path of water flow that exists in the area to prevent pooling of water along the drainage channels. Lining drains with concrete, stone or brick will allow faster water flow, reduce silting and weed growth, but will add substantially to the costs of implementation. Integrated control of breeding sites by improving drainage, filling and leveling and planting eucalyptus has been used to convert a once prolific area of mosquito breeding in a peri-urban area into a public park in Zambia. Tree planting to drain boggy ground has also been used as part of an integrated program to reduce malaria transmission and help reforestation for the provision of wood and improvement of water management in Gujarat, India. In many instances, the economics of proper drainage does not indicated sufficient rates of return to warrant the investment. Such economics might be improved if the drainage reduces the incident of disease and the socio-economic benefits of this reduction are included in the cost analysis.

THE 'LIDO SYSTEM'

In areas of extensive water covered with vegetation where drainage is impractical, the area can be deepened to the extent that plants cannot grow. If the banks of the impoundment are also steepened and stabilized, the introduction of larvivorous fish can reduce mosquito production dramatically.

SUBSOIL DRAINAGE

Subsurface drainage is used in wet areas for preventing water logging, improving aeration and reducing stalinization. Such drains are constructed of channels filled with rock, rubble or gravel and covered with vegetation ('French' drain), stones alone or pipes.

DESIGN OF DRAINAGE SCHEMES

The design of drainage systems can be relatively simple in small areas, but can be extremely complex over large areas. Generally a system of grid-iron drainage, with few junctions, is preferred to the herringbone arrangement with many junctions since blockages tend to occur at junctions thus increasing mosquito breeding.

COASTAL SWAMP DRAINAGE

Constructing embankments to prevent the inundation of seawater at high tides can assist drainage of some coastal swamps. Pipes fitted into the embankments with an automatic outflow gate will allow water from the lagoon to be drained at low tide. A saltwater marsh drainage project, combined with larviciding and anti-malarials for case treatment was used to control a malaria epidemic in Haiti.

VERTICAL DRAINAGE

In flooded areas lined with silt or clay over permeable bedrock, shafts can be sunk through the impermeable layer to allow water to leak into the permeable strata below.

DRINKING WATER PROVISION

Provision of safe drinking water and ensuring the related infrastructure is not causing seepage, leakage or standing water is an important environmental management measure in itself. This is particularly so since it allows people to move their settlements away from water bodies on which they would otherwise rely for their drinking water.

REDUCTION OF MAN-MOSQUITO CONTACT

Because mosquitoes tend not to fly far from their breeding habitats, about 2-4km, site selection is an important part of environmental control of malaria. Positioning houses 1.5 to 2 km from large breeding sites will result in a substantial reduction in transmission. Similarly villages at higher elevations and exposed to the wind will also have fewer mosquitoes than sites situated in the lowlands where it is less windy and small water bodies abound. Where the land within the mosquito flight range is sparsely populated or in areas flooded during dam construction, it may be possible to persuade people to move away from mosquito-breeding habitats. In rice-growing areas, where prodigious numbers of adult mosquitoes are often produced, it has also been suggested that areas immediately next to the rice fields should not be inhabited in order to reduce exposure to malaria parasites. This practice of dry belting villages in rice-cultivation areas is theoretically sound, but in reality, as with the previous examples, encouraging people to move away from water is extremely difficult to achieve and is not widely applicable as an intervention measure.

Since most mosquitoes searching for blood fly close to the ground, one of the simplest ways of avoiding mosquito bites is to build homes off the ground. In the early 1900s, it was recommended that around Rome the floor of a house should be raised off the ground and be built at least two stories high to provide bedrooms for the occupants on the top floor and reduce biting by mosquitoes. Even today people can reduce biting by sitting in the evening on raised platforms.

Mosquito proofing of dwellings is also possible. Screening of windows has contributed to the elimination of malaria from many parts of the world. Recently, a risk factor survey for malaria showed that well-built homes and those with ceilings or closed eaves are protected from mosquitoes and malaria. A recent study using experimental huts in The Gambia demonstrated that installing a ceiling made of netting reduced transmission by 80%.

In addition to how infrastructure is built, there are techniques that have been effectively undertaken to use available infrastructure to reduce mosquito populations. Examples of these environmental manipulations are as follows:

CONTROLLING WATER LEVELS

Intermittent irrigation has been used effectively for controlling mosquitoes in rice growing areas. Here paddies are cyclically drained and flooded during the planting and growing seasons. While it depresses mosquito breeding in the rice fields, temporary removal of water should not reduce rice yields and may actually increase yields by restricting weed growth. This method is successful in India, China, and other parts of Southeast Asia.

In India intermittent irrigation combined with the use of extracts from the neem tree lead to a reduction in anophelines. However, intermittent irrigation was less successful with mosquito species that rapidly colonize paddies shortly after flooding, such as the African mosquito, *An. gambiae* s.l. In this case, piddling of paddies after drainage can still lead to large numbers of mosquitoes being produced. In contrast to this, maintaining a continuous water depth the formation larvae.

STREAM SLUICING OR FLUSHING

Water releases can be used to actually flush out mosquito larvae from the streambed. Existing irrigation infrastructures have been manipulated in tea and rubber plantations in South-East Asia, where the larvae

prefer the relatively still water at the edges of streams. Flushing has also been used successfully to control larvae in rice fields in Mexico. Using this technique requires management controls, as well as a clear understanding of how much water is available for larval control without compromising other beneficial use requirements.

CHANGES OF WATER SALINITY

In certain situations raising the salinity of coastal marshes or lagoons through the introduction of saltwater may lead to a reduction in anophelines. This is only feasible where the local vector cannot breed in salt water and where rainfall is not heavy.

SHADING OF STREAM BANKS

This method of control was used to control *An. maculatus* in Assam, India, where it prefers open areas of water. Such approaches have also been used against *An. fluviatilis* and *An. sundaius*. Under dense shade, no vegetation grows near the edges of the stream so that the current takes away mosquito larvae and renders them more susceptible to predation by fish.

VEGETATION CLEARING

Clearing of vegetation has been used to control *An. balabacensis* in Sabah and may have an effect on *An. minimus* that prefers larval habitats along the edges of streams in the shade. Alternatively large-scale clearance of forest may result in increases of *An. minimus*. In general, clearing of vegetation removes resting places for outdoor sheltering mosquitoes and increases water evaporation contributing to a reduction in breeding sites. On the other hand such exposed sites may favor other vector species. Planting trees with high water requirements, such as *Eucalyptus robustus*, can also help reduce surface water.

WATER POLLUTION

Pollution of water has been used as a deliberate method for the control of *An. fluviatilis* and *An. maculatus* in India and Malaysia. Here vegetation such as grass clippings and other vegetable compost is added to water sites to increase anaerobic decomposition that can deter some mosquitoes from laying eggs. This procedure, though, may favor some culicine mosquitoes, increasing biting locally.

LARVIVOROUS FISH

Fish are exceptionally good predators of mosquito larvae. In Guangzhou county, China, common and grass carp fry are released into paddies soon after rice seedlings are planted, and receive no supplementary feed. Here, an increase in fish stocking has been correlated with a decrease in malaria incidence over the same time period. Using edible fish can turn environmental management into a profitable method of malaria control; the net return from a concurrent rice-fish crop system was 52% above that of the rice crop alone. A ditch-ridge system in the paddies will facilitate water drainage required to speed up rice development and allow fish to be kept in the ditches before the blooming stages. The economic benefits of fish may also encourage community participation in mosquito control. When this is tried it is important that indigenous species are used so as not to disturb local ecosystems. Indiscriminate use of inappropriate fish species may not only offer little biological control advantage, but it can endanger both rare and economically desirable species.

ANNEX 14: CORRUPT BEHAVIOR IN THE MINING INDUSTRY

ILLCIT BEHAVIOUR

The value of official exports would be much higher were it not for smuggling. Unofficial government estimates place the level of smuggling at 50%, and one recent study suggests that it is much higher. In addition to diamonds being smuggled out, diamonds are also smuggled in from Guinea, Liberia, and elsewhere.

BOX E. EXAMPLES OF CORRUPTION TYPICALLY FOUND IN THE MINING SECTOR

- | | |
|----|---|
| 1. | Illicit payments of 'speed money' or 'grease' to officials for the timely delivery of goods and services to which the public is rightfully entitled, such as permits and licenses. |
| 2. | Illicit payments to officials to facilitate access to goods, services, and/or information to which the public is not entitled. |
| 3. | The theft or embezzlement of public property and monies. |
| 4. | Extortion and the abuse of public office, such as using the threat of a tax audit or legal sanctions to extract personal favors. |
| 5. | The sale of official posts, positions, or promotions; nepotism; or other actions that undermine the creation of a professional, meritocratic civil service. |
| 6. | Illicit payments to prevent the application of rules and regulations in a fair and consistent manner, particularly in areas such as public safety, law enforcement or revenue collection. |
| 7. | The design or selection of uneconomic projects because of opportunities for financial kickbacks or political patronage. |
| 8. | Procurement fraud, including, kickbacks, collusion, overcharging, misrepresentation, the delivery of substandard goods and services. |

*Asian Development Bank 1999.

ANNEX 15: CROP PRODUCTION IN SIERRA LEONE

Table 13. Sierra Leone Crop Production Information (area harvest in acres) FAO 2004

Year	Rice, Paddy	Maize	Millet	Sorghum	Cereals nes	Sweet Potatoes	Cassava	Taro (Coco Yam)	Sugar Cane	Broad Beans, Dry	Peas, Dry	Pulses nes	Kolanuts	Groundnuts in Shell
1980	410,000	13,000	9,000	7,000	1,500	5,000	25,000	8,000	0	550	1,770	52,000	0	12,000
1981	400,000	13,000	10,000	7,000	1,500	5,000	28,000	7,000	1,000	550	1,800	52,000	0	19,000
1982	400,000	14,000	10,000	8,000	1,500	5,000	29,600	6,500	1,000	550	1,900	52,000	0	14,000
1983	370,000	14,000	16,000	12,000	1,500	5,000	31,000	5,500	1,000	550	1,950	52,000	0	14,000
1984	318,892	13,000	17,000	15,000	1,500	4,500	26,000	4,500	1,000	500	1,900	52,000	0	20,000
1985	339,865	13,000	17,000	18,000	1,500	4,500	24,000	3,500	1,000	560	2,000	52,000	15,000	22,000
1986	339,865	14,440	17,000	18,000	1,500	4,500	22,000	2,700	1,000	580	2,000	52,000	15,000	20,600
1987	357,381	11,000	15,000	18,000	1,500	5,000	28,000	1,800	1,000	600	2,000	53,000	15,000	19,000
1988	387,800	10,000	24,000	24,000	1,500	5,000	28,000	1,700	1,000	620	2,050	54,000	15,000	19,900
1989	403,200	10,000	24,000	25,000	1,500	5,000	19,600	1,600	1,000	620	2,100	55,000	15,000	21,400
1990	392,600	11,300	25,800	37,400	1,500	3,900	20,600	900	1,000	650	2,100	56,000	15,000	21,400
1991	372,970	12,100	27,800	39,300	1,500	4,100	22,852	1,500	1,000	660	2,100	56,000	15,000	24,800
1992	354,322	12,222	27,875	37,000	1,500	4,083	22,000	1,478	700	667	2,125	60,000	8,000	21,000
1993	382,000	11,611	26,481	35,150	1,425	3,879	23,100	1,404	350	633	2,019	59,700	15,000	20,600
1994	328,300	9,600	31,100	28,700	4,000	15,700	41,500	1,400	800	650	2,000	55,000	15,000	40,200
1995	274,500	8,200	30,000	25,700	2,700	14,100	37,500	1,200	300	700	2,000	55,000	15,000	36,200
1996	289,200	9,000	26,000	27,000	3,300	15,000	48,000	1,200	300	700	2,000	60,000	15,000	36,500
1997	316,400	10,000	29,000	28,000	3,800	17,300	62,000	1,200	300	700	2,000	65,000	15,000	37,200
1998	284,770	8,000	17,000	23,000	2,800	15,000	56,000	1,200	300	700	2,000	71,000	15,000	37,000
1999	213,054	7,090	4,948	22,400	2,600	7,547	46,224	1,080	300	700	1,700	75,000	15,000	35,507

Year	Rice, Paddy	Maize	Millet	Sorghum	Cereals nes	Sweet Potatoes	Cassava	Taro (Coco Yam)	Sugar Cane	Broad Beans, Dry	Peas, Dry	Pulses nes	Kolanuts	Groundnuts in Shell
2000	183,214	9,588	4,003	6,231	2,700	10,642	46,490	960	300	700	1,275	75,000	15,000	19,026
2001	185,000	9,700	4,600	12,000	2,800	10,000	55,000	1,000	300	800	1,400	80,000	15,000	21,000
2002	200,000	15,297	11,612	17,298	2,900	10,319	61,000	1,000	300	800	1,400	80,000	15,000	21,000
2003	200,000	10,000	10,000	9,000	2,900	10,500	74,143	1,000	300	800	1,400	80,000	15,000	21,000
2004	200,000	10,000	10,000	9,000	2,900	10,500	75,000	1,000	300	800	1,400	80,000	15,000	21,000

Table 13. Sierra Leone Crop Production Information (area harvest in acres) FAO 2004 (cont'd)

Year	Coconuts	Oil Palm Fruit	Sesame Seed	Tomatoes	Vegetables Fresh nes	Plantains	Citrus Fruit nes	Mangoes	Fruit Fresh nes	Coffee, Green	Cocoa Beans	Pimento, Allspice nes	Spices nes	Tobacco Leaves
1980	1,700	31,000	2,200	1,800	23,200	4,800	0	0	0	8,000	21,000	900	0	500
1981	1,700	31,000	2,400	2,000	24,000	4,800	0	0	0	8,000	22,000	900	0	500
1982	1,700	31,000	2,600	2,200	24,800	5,200	0	0	0	8,000	35,000	900	0	500
1983	1,700	31,000	2,800	2,500	25,600	5,200	0	0	0	9,000	30,000	900	0	500
1984	1,700	31,000	3,000	2,300	25,000	5,200	0	0	0	10,000	40,000	900	0	500
1985	1,700	31,000	3,100	2,600	27,000	5,300	13,000	910	10,000	11,000	45,000	900	500	500
1986	1,700	31,000	3,300	2,700	27,000	5,400	13,000	910	10,000	11,000	50,000	1,000	365	550
1987	1,700	31,000	3,700	2,800	27,000	5,450	13,000	910	10,000	11,000	55,000	1,000	475	600
1988	1,700	31,000	3,800	2,800	27,000	5,480	13,000	1,310	10,000	10,500	52,000	1,000	260	600
1989	1,700	31,000	4,200	2,800	27,000	5,500	13,000	1,610	10,000	10,200	55,000	1,000	260	600
1990	1,700	31,000	4,800	2,800	27,000	5,150	13,000	1,910	10,000	11,200	57,500	1,000	260	600
1991	1,700	31,000	4,700	2,800	27,000	5,150	13,000	2,210	10,000	11,500	62,500	1,000	260	600
1992	1,900	29,200	4,500	2,800	27,000	5,150	13,000	2,510	10,000	11,304	20,000	1,000	230	600
1993	2,100	29,150	4,295	2,660	25,000	5,150	13,000	2,810	10,000	10,739	20,000	1,000	230	570
1994	2,300	28,700	4,300	3,500	25,000	5,150	13,000	3,110	10,000	15,000	32,000	1,000	230	600
1995	2,500	27,900	4,100	3,000	25,000	5,150	13,000	3,410	10,000	14,000	27,000	1,000	250	600
1996	2,700	29,500	4,100	3,000	25,000	5,150	13,000	3,710	10,000	14,000	27,000	1,000	250	600
1997	2,900	30,500	4,500	2,800	25,000	5,150	13,000	4,016	10,000	14,000	35,000	1,000	250	300

Year	Coconuts	Oil Palm Fruit	Sesame Seed	Tomatoes	Vegetables Fresh nes	Plantains	Citrus Fruit nes	Mangoes	Fruit Fresh nes	Coffee, Green nes	Cocoa Beans	Pimento, Allspice	Spices nes	Tobacco Leaves
1998	2,900	24,800	4,500	2,800	26,000	5,200	13,500	4,016	10,000	14,000	35,000	1,000	250	678,036
1999	2,900	21,800	3,060	2,518	27,000	5,300	14,000	4,016	10,000	14,000	30,000	1,000	250	569,054
2000	2,610	21,800	3,060	1,209	27,000	5,300	14,000	4,016	10,000	14,000	30,000	1,000	250	509,414
2001	2,700	22,000	3,100	1,350	30,000	5,400	14,000	4,000	15,000	16,000	30,000	1,000	250	543,440
2002	2,700	22,000	3,100	1,350	32,000	5,400	14,000	4,000	16,000	16,000	30,000	1,000	250	585,766
2003	2,700	22,000	3,100	1,350	32,000	5,400	14,000	4,000	16,000	16,000	30,000	1,000	250	583,883
2004	2,700	22,000	3,100	1,350	32,000	5,400	14,000	4,000	16,000	16,000	30,000	1,000	250	584,740